AIR CAMPAIGN

OPERATION *LINEBACKER I* 1972

The first high-tech air war

MARSHALL L. MICHEL III | ILLUSTRATED BY ADAM TOOBY

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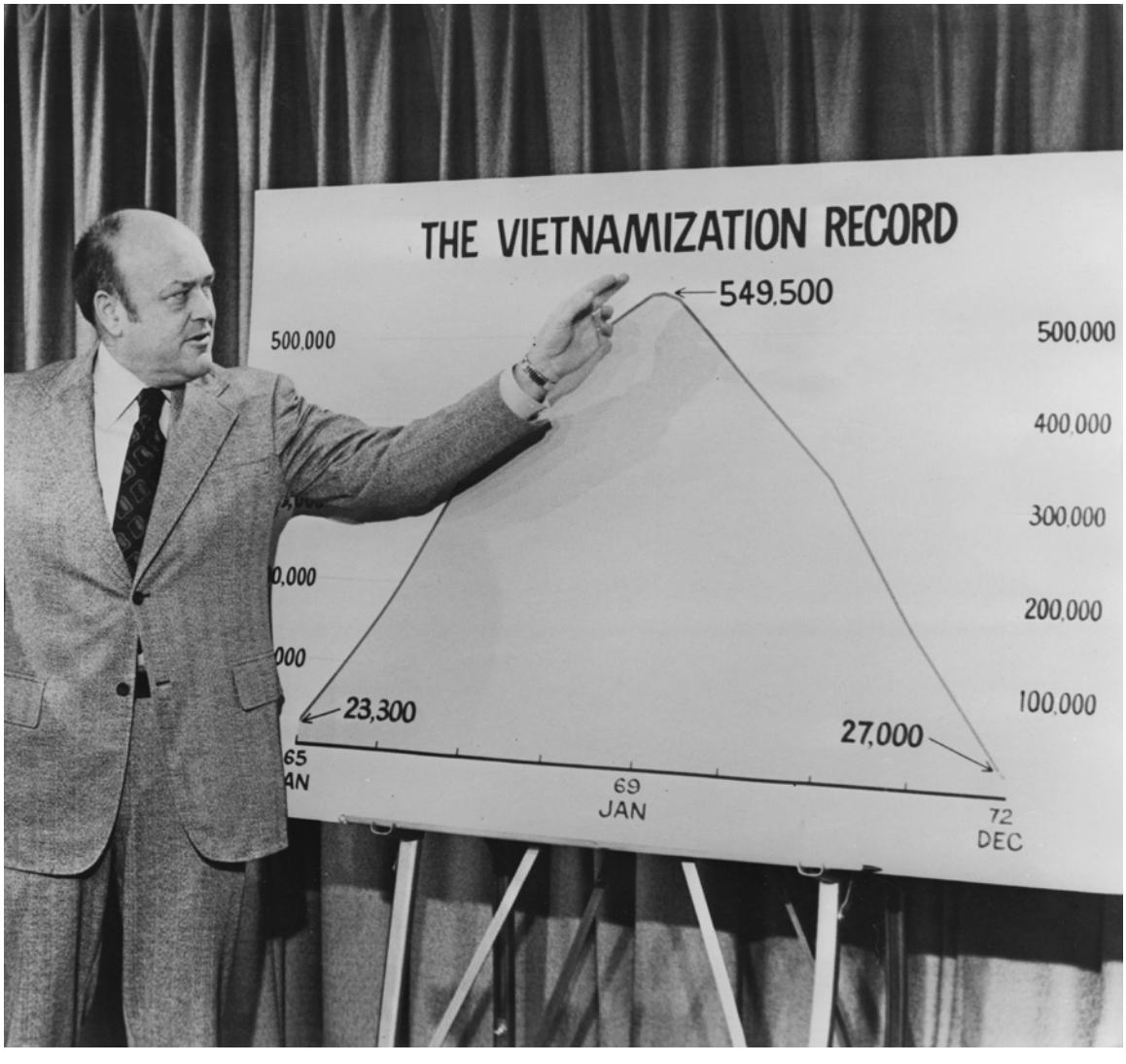
INTRODUCTION

Nixon and Kissinger, photographed at New York's Waldorf Astoria Hotel discussing obstacles to a peace deal in Vietnam. Achieving a settlement was key to Nixon's 1972 re-election campaign. (Bettmann/ Getty)

At the beginning of 1972, the United States and North Vietnam had entirely different plans for the year. For the Americans it was an election year and President Richard Nixon, who would be running for a second term, and his National Security Advisor, Henry Kissinger, had a number of initiatives planned that they hoped would guarantee a victory. The most critical issue was the Vietnam War. While the Paris peace talks were at a stalemate it seemed probable that the war would continue winding down. The Vietnamization program – under which South Vietnamese forces were being trained and equipped to take over their own defense – was proceeding well and before the election the final withdrawal of American ground combat troops would be complete. At the same time, there were two diplomatic initiatives that stood on their own but could also influence the peace process. Nixon planned on becoming the first US President to visit Communist China in February, and in May he would sign the SALT (Strategic Arms Limitation Talks) treaty with General Secretary Leonid Brezhnev of the Soviet Union.

The North Vietnamese thought otherwise, although in their own way they also sought an end to the Vietnam War. They had steadily built up strong ground forces in three areas along the South Vietnamese border, in the Demilitarized Zone (DMZ) in North Vietnam proper, in the Central Highlands, and on the Cambodian border across from Saigon in preparation for a full-scale invasion in the spring. The North Vietnamese diplomatic sources and their anti-war friends in the United States all agreed that because of public opinion and the upcoming election any US response would be muted, especially since much of America's air power had been withdrawn and US ground troops would not be used in combat.

American intelligence had watched the build-up and noted that it seemed to be much greater than normal, so Nixon launched some bombing raids on the supply areas and ordered more B-52s sent to the region. However, given the importance of the upcoming meetings with China and the Soviet Union, the patrons of North Vietnam, these responses were restrained.



Despite the invasion, Nixon continued and even increased the pace of America's withdrawal from Vietnam. Here, US Secretary of Defense Melvin Laird holds a press conference to explain the reduction in US troop levels, the so-called "Vietnamization Record," in Washington DC, on October 16, 1972. (Consolidated News Pictures/Keystone/Getty Images)

On March 30 the North Vietnamese began a three-pronged attack against South Vietnam. The first attacks came across the DMZ by three People's Army of Vietnam (PAVN) divisions, followed by another major push thorough the Central Highlands, and then by an attack from Cambodia aimed at Saigon. For the first time the PAVN used a large number of tanks, and quickly began to rout many South Vietnamese units.

But the North Vietnamese badly miscalculated. Having never fought a conventional war, they did not realize how exposed a conventional attack – with its supply lines and massed troops and armor – would be to air power, and they underestimated how rapidly the US could move large numbers of aircraft to the region. They also did not realize that the US now had several new systems designed to transform the effectiveness of air attacks, from laser-guided bombs to the first helicopter-mounted wire-guided missiles. Perhaps most importantly they underestimated Nixon's willingness to use air power in an almost unrestrained way. For the next six and a half months the PAVN was pounded by American air power, both in South Vietnam and in North Vietnam, suffering over 100,000 casualties with little military progress to show for it. The campaign was *Linebacker*, and the technology it brought to bear was the start of an air power revolution.

CHRONOLOGY

1971

July China announces that it will play host to President Nixon in February 1972. This unsettles the North Vietnamese as China is one of their biggest supporters.

December 26–30 With evidence that the North Vietnamese are planning an invasion, Nixon authorizes *Proud Deep Alpha*, bombing as far north as the 20th Parallel, but the strikes are hampered by bad weather and are generally ineffective.

December 29–February 8, 1972 In Operation *Commando Flash*, 18 F-4s from Clark AFB (Air Force Base), Philippines, are sent to Korat RTAFB (Royal Thai Air Force Base), six to Ubon RTAFB, and six to Udorn RTAFB.

1972

February 3 North Vietnamese air force establishes the 927th "Lam Son" Fighter Regiment flying MiG-21s.

February 5 *Arc Light* surge. Eight B-52Ds are moved from Andersen AFB, Guam, to U-Tapao RTAFB, Thailand.

February 8 Operation *Bullet Shot* deployment begins. This was the build-up of B-52 bombers, KC-135 tankers, and supporting elements in Southeast Asia as part of efforts to prepare for a North Vietnamese invasion of South Vietnam.

February 8 *Bullet Shot I*, 29 B-52Ds to Andersen AFB, ten KC-135s to Kadena AFB, Japan.

February 21–28 Nixon travels to China, meets with Chairman Mao.

March 23 The US cancels further peace talks in Paris due to the lack of progress.

March 30 The first phase of *Nguyen Hue*, the PAVN invasion of South Vietnam, is launched after a long build-up and begins some of the most intense fighting of the entire war. Three PAVN divisions, supported by regiments of tanks and artillery, roll across the DMZ that separates the two Vietnams.

April–May Operation *Constant Guard* series of deployments begins; 176 F-4 Phantoms and 12 F-105Gs from bases in the Republic of Korea and the US move to Thai air bases between April 1 and May 11.

April 1 Nine more F-4s arrive at Da Nang.

April 2 Chairman of the Joint Chiefs of Staff (CJCS) Admiral Moorer is authorized to send fighter strikes up to 25 nautical miles north of the DMZ.

April 2 PAVN force of three infantry divisions crosses the border from the North Vietnamese sanctuaries in Cambodia to attack Bình Long Province, north of Saigon, and soon surrounds An Loc.

April 5 *Bullet Shot II*, 29 B-52Ds flown to Andersen AFB, nine KC-135s to Kadena AFB.

April 5 US Air Force begins regular tactical strikes against North Vietnam north of the 20th Parallel, Operation *Freedom Train*.

April 6 1st Marine Aircraft Wing (F-4/A-6) arrives at Da Nang air base, South Vietnam.

April 9–10 First large-scale B-52 attacks on North Vietnam. Twelve B-52Ds from U-Tapao hit the Vinh oil tank farm and the Vinh railyard, while 20 F-4s lay a chaff trail for the B-52s, the first major use of chaff since World War II.

April 11 *Bullet Shot III*, 28 B-52Gs to Andersen AFB, three KC-135s to Kadena AFB.

April 12/13 Operation *Freedom Dawn*. Eighteen B-52s strike Thanh Hoa's Bai Thuong air base. Three more days follow before another strike, this time by another 18 bombers in a pre-dawn attack against an oil tank farm outside Haiphong. They are followed by more than 100 tactical aircraft attacking targets around Hanoi and Haiphong during daylight.

April 14 Third phase of invasion begins with three PAVN divisions moving in from eastern Laos and seizing a series of border outposts around Dak Toin in Kontum Province in the Central Highlands. They are eventually stopped at the city of Kontum.

April 16 Operation *Freedom Porch.* B-52s with a chaff corridor and heavy escort bomb the fuel storage tanks at Haiphong, setting fires visible from 110 miles away. Carrier aircraft join Air Force fighter-bombers in battering a tank farm and a warehouse complex on the outskirts of Hanoi.

April 16 *Constant Guard I,* 18 F-4Es from Homestead AFB, Florida, and 18 F-4s from Eglin AFB, Florida, to Udorn RTAFB.

April 19 *Constant Guard II,* 36 F-4Es from Seymour Johnson to Ubon RTAFB, four EB-66s from Shaw to Korat RTAFB, 12 F-105Gs from Seymour Johnson to Korat RTAFB.

April 19 Two MiG-17s from the 923rd Fighter Regiment attack US Navy ships off the coast of North Vietnam. USS *Higbee* is damaged, USS *Oklahoma City* slightly damaged.

April 19–22 ARVN repulses second major attack on Kontum.

April 20 Kissinger meets secretly with Brezhnev in Moscow. Brezhnev agrees to apply pressure to Hanoi to end the offensive and negotiate seriously.

April 21 *Freighter Captain*, B-52 bombing of Thanh Hoa.

April 23 *Frequent Winter*, B-52 bombing of Thanh Hoa.

April 23 A major PAVN thrust towards the towns of Dak To/Tac Canh caused a surprise collapse of two ARVN regiments.

April 27 ARVN (Army of the Republic of Vietnam) defenses in Quang Tri Province begin to collapse.

May 1 ARVN abandoned Quang Tri, giving the PAVN its first major victory of *Nguyen Hue.*

May 2 PAVAN advance halted after conquest of Quang Tri.

May 2 Kissinger and Hanoi's lead negotiator Le Duc Tho hold secret meeting in Paris. The North Vietnamese, sensing victory, refuse to make concessions.

May 3–13 *Constant Guard III*, 72 F-4Ds from Holloman AFB, New Mexico, to Takhali RTAFB, closed since 1970.

May 4 Nixon orders the Joint Chiefs to prepare to execute the aerial mining of Haiphong.

May 9 At 9.00am Saigon time, Haiphong harbor is mined by A-6s and A-7s in Operation *Pocket Money.* The operation is timed to coincide with a televised speech by Nixon at 9.00pm on May 8 (Eastern Standard Time).

May 10 Operation *Linebacker* begins, the large-scale bombing operations against North Vietnam by tactical fighter aircraft of the Seventh Air Force and Task Force 77. On the first day of the operation 414 sorties are flown, 120 by the Air Force and 294 by the Navy; it is the heaviest single day of air-to-air combat during the Vietnam War, with at least nine North Vietnamese MiGs, two US Air Force and two US Navy aircraft shot down.

May 11 Doumer bridge in Hanoi is dropped by F-4Ds of the 8th Tactical Fighter Wing (TFW) carrying laser-guided bombs (LGB).

May 13 F-4Ds of the 8th TFW drop the Thanh Hoa Bridge using LGBs and electro-optically guided bombs (EOGB, aka TV-guided bombs).

May 13/14 PAVN attack on Kontum begins.

May 17 A-4 Skyhawks of Marine Aircraft Group 12 arrive at Bien Hoa air base, South Vietnam.

May 18 Uong Bi electric power plant near Haiphong knocked out with LGBs, the beginning of strikes on a class of targets formerly avoided, including power plants and shipyards.

May 22 *Bullet Shot IV*, eight B-52Gs to Andersen AFB.

May 22–29 Nixon meets with Brezhnev in Moscow, signs SALT I treaty.

May 27 *Bullet Shot V*, 58 B-52Gs to Andersen AFB. 210 B-52Ds and B-52Gs are now deployed in East Asia, more than half of Strategic Air Command's entire strategic bomber force.

June Air Force Chief of Staff Ryan visits the theater to discuss heavy USAF losses to MiGs and to press for more missions and all-weather bombing.

June 5 Siege of Kontum in MR (Military Region) II ends.

June 8 Siege of An Loc, MR III, ends.

June 28 ARVN launches *Lam Son 72* in MR I to remove PAVN.

August The last US Army combat troops depart South Vietnam. Only 43,000 American airmen and support personnel remain.

September 15 Quang Tri city retaken.

September 29 *Constant Guard IV*, 72 A-7Ds from the 354th TFW, Myrtle Beach, South Carolina, deploy to Korat RTAFB.

October 1–4 F-111s arrive at Takhali RTAFB, Thailand.

October 11 Kissinger and Le Duc Tho reach an agreement on a peace settlement. US stops bombing in the Hanoi area.

October 23 US ends *Linebacker I* operations to help promote the peace negotiations being held in Paris.

ATTACKERS' CAPABILITIES

NEW TECHNOLOGY FOR THE LAST VIETNAM AIR BATTLES

The two aircraft perhaps most responsible for stopping the Easter Offensive are shown here at Andersen: a B-52 (landing) and KC-135 tankers (foreground) which the Air Force PGM (precision-guided munitions) strikes required to reach North Vietnam. (Author's collection)

By the start of 1972, the Americans had reduced their number of aircraft and carriers in the region, but the critical infrastructure for large air forces was still in place at air bases in Thailand, Guam, and South Vietnam and the Air Force had a large fleet of KC-135 tankers. With tankers and infrastructure, when the invasion began the Air Force was able to rush a large number of aircraft to the region and bed them down, and the Navy quickly moved in more carriers to bring the total to four, with almost 300 aircraft.

To counter the North Vietnamese attack, the Air Force had four bases in Thailand that were divided by mission specialty. Udorn's specialty was air-to-air, Ubon's was guided weapons and chaff droppers, Korat was for electronic warfare and Wild Weasels (fighters equipped with radar-seeking missiles), and Takhali F-4s were general purpose and used mainly for ground attack and escort duties. There were also fighter-bombers at Da Nang and Bien Hoa in South Vietnam, and the US fighter-bombers that had poured back to American bases and strike aircraft from aircraft carriers used and benefited from these airfields. They were very close to the battlefields in South Vietnam, so American fighters could fly several sorties a day from these bases in support of the beleaguered South Vietnamese troops. The B-52s, soon over 200 of them, were based at Andersen AFB, Guam, and U-Tapao RTAFB, Thailand, and KC-135 tankers at U-Tapao and Kadnea.

In the South, to counter the PAVN attacks the large numbers of B-52s that Nixon insisted be sent to the region were the most important factor. The B-52s could not only deliver an incredible number of bombs day or night in virtually any weather conditions – an extremely important point given the bad weather at the beginning of the invasion – but the US now had a command and control system in place for the B-52s that could both change targets quickly to meet the ground tactical situation and also guide the bombers so they could bomb very close to allied troops. The US also had a number of large, fixed-wing AC-130 and AC-119 gunships that could provide very accurate gunfire, especially at night, and a large number of attack helicopters. Moreover, they were able to

The backbone of the US Army attack helicopter force was the AH-1G Cobra. While relatively lightly armed (with unguided rockets and a small-caliber minigun, though some were upgraded with a 20mm cannon), it was fast, small, and very maneuverable, and with its aggressive crews proved very effective on the battlefield. (US Army Heritage)

bring in a few new attack helicopters carrying antitank guided missiles that proved very effective.

Finally, and very importantly, the US had a very robust airlift capability with C-130 transports, and their resupply efforts were directly responsible for saving at least two critical South Vietnamese positions.

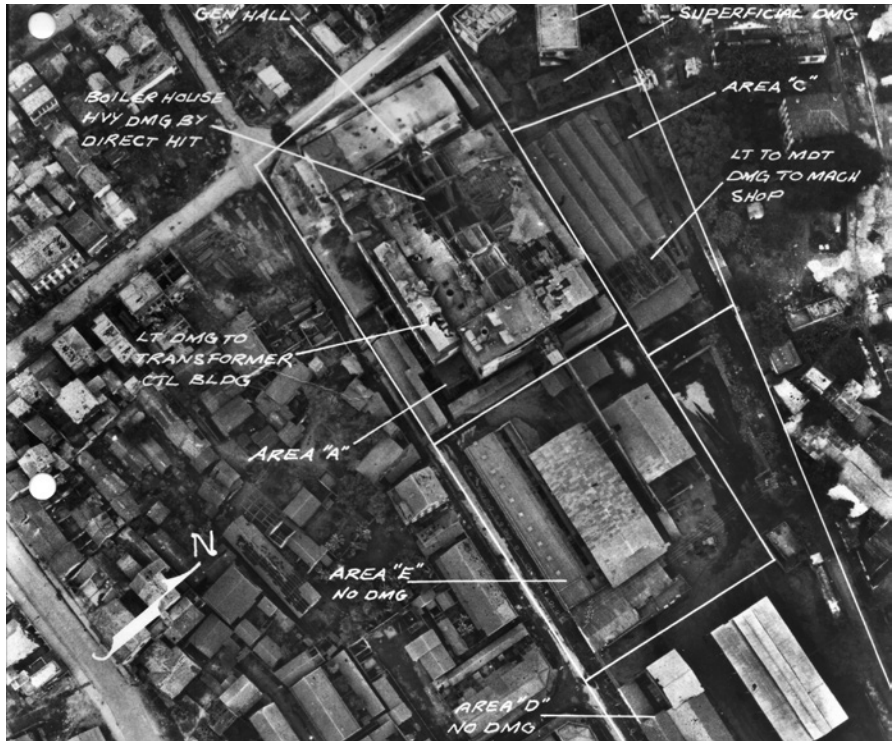
For attacks in the North, the US had made some major operational changes after the 1965–1968 *Rolling Thunder* campaign and the USAF especially brought many unpleasant surprises for the North Vietnamese. The main North Vietnamese defensive system during the *Rolling Thunder* bombing campaign had been the SA-2 missile, but it had been partly negated by American jamming pods. Now American raids would still use jamming pods, but Air Force raids had a much more effective system to foil the SA-2, namely corridors formed by laying chaff, and aircraft flying in these corridors were completely protected from SA-2s. The Air Force also had very accurate precision-guided munitions (PGM) to take out specific small targets, but to deliver these weapons, and to protect the limited number of *Pave Knife* laser designator pods, the Air Force had to use very large support forces. Their sheer size limited the Air Force to one raid a day for much of *Linebacker*.

Navy attacks were very much the same as they had been during *Rolling Thunder*, using their carriers' proximity to the shore to strike hard and quickly and then escape. One added weapon for the Navy was the antiship mine, which they planted in Haiphong harbor on May 9 and in several other harbors as the campaign progressed.

Both the Air Force and the Navy used the F-4 Phantom II extensively, the Navy for normal air-to-air and air-to-ground attack while the Air Force used it in a variety of different ways. The Air Force's F-4Ds were the delivery weapon for the PGMs, while other F-4Ds were fitted with another system that would be an unpleasant surprise to the North Vietnamese, the APX-81 *Combat Tree*, which could read the North Vietnamese MiG transponders. The Air Force also had a new F-4, the F-4E, which carried an internal 20mm cannon that was expected to make it more effective in air-to-air engagements.

The Navy operated from carriers and had an excellent attack aircraft, the A-6A Intruder, that could carry a very heavy bomb load and bomb day or night, as well as the A-7E Corsair II and a few A-4 Skyhawks, both of which carried a useful bomb load. For refueling and electronic countermeasures (ECM), the Navy used the EKA-3B Skywarrior.

For suppression of surface-to-air-missile (SAM) sites, the Air Force operated in almost the same way as it had during *Rolling Thunder*, using the F-105G Wild Weasel with Shrike missiles and Standard ARM (anti-radiation missiles), and later pairing them with F-4Es as a SAM site hunter-killer team. The Air Force also had a large fleet of KC-135 tankers, without which they could not have carried out their operations from their main bases in Thailand.



The accuracy of the laser-guided bombs made it possible to hit not only small targets but also small targets in heavily populated areas. The Hanoi thermal power plant was off limits during *Rolling Thunder* because it was located in a civilian neighborhood but was quickly knocked out during *Linebacker*. This post-strike reconnaissance photo shows that virtually no damage was done to the surrounding buildings. (USAF)

For air-to-air combat, though the F-4s in both services had fared badly against the North Vietnamese MiGs during the latter part of *Rolling Thunder*, the two services had entirely different responses to the losses.

The F-4 used two types of air-to-air missile, the AIM-7 *Sparrow* radar guided missile and the AIM-9 *Sidewinder* heat-seeking missile, and both had proved ineffective in combat so far. The Navy looked carefully at the missiles and decided that the AIM-7 was too complicated to be properly maintained on a carrier, so it had its F-4 crews learn to use the AIM-9, which was much more reliable. The Navy developed an improved AIM-9, the AIM-9D, and, more importantly, set up a school, *Top Gun*, to teach F-4 crews how to win dogfights using the AIM-9D.

The Air Force, on the other hand, decided that the MiGs' success was only because of the advantage they had operating over their own territory, so it actually *cut* air-to-air training for F-4 crews and told the crews to continue to use the still-unreliable AIM-7 as their primary air-to-air weapon. The result was that during *Linebacker* Navy F-4 crews were vastly better at air-to-air combat than Air Force F-4 crews, and the kill-to-loss ratio would show that.

Controlling aircraft in air-to-air combat (ground-controlled intercepts, or GCI) was very important, and the Navy had an excellent control system called *Red Crown* in a rotating radar command and control ship just off the North Vietnamese coast. The Air Force, on the other hand, struggled with control issues during all of *Linebacker*, relying on a cobbled-together system called *Teaball* that never worked very well and caused a number of losses, so Air Force crews used *Red Crown* whenever they were in range.

The weather was always a problem – perhaps the biggest problem for strikes in both South Vietnam and North Vietnam – and especially so with PGMs, which could only operate in fairly clear weather. The Air Force did have two instrument bombing systems: *Combat Skyspot*, which worked well in South Vietnam and was the B-52s' main delivery system, and LORAN (long range navigation) used by specially equipped F-4Ds over North Vietnam, which was generally ineffective.

DEFENDERS' CAPABILITIES

HOLDING OFF THE COUNTEROFFENSIVE

An F-4, probably from the 8th TFW, shot down over southern North Vietnam on July 7 on a low-level "fast FAC (forward air controller)" mission flown by F-4s into high-threat areas. (AFHRA)

In the south, the North Vietnamese struggled to find a way to protect the PAVN from American air attacks. They had moved a number of SA-2 SAM sites to just north of the DMZ and they supported the PAVN attack in MR I for a time, but gradually the Americans hunted them down and destroyed them. A new weapon, the heat-seeking SA-7 *Strella* shoulder-fired missile, was able to negate attack helicopters and propeller-driven aircraft to an extent, but it was in short supply and few made it to the southern battlefields. Also, the SA-7 could be neutralized by flying high and it was almost useless against jet fighters. The PAVN had a large number of manually operated antiaircraft guns, but while they caused losses, sometimes heavy losses, they could not turn the tide of allied air power.

In the north, the North Vietnamese had reinforced their air defenses since *Rolling Thunder*. They had new, modified SA-2s that were expected to neutralize the American ECM pods, and the new missile launch vans now had an optical guidance system in case the guidance radar was jammed. They had also doubled the size of their fighter force, and at the beginning of *Linebacker* had four fighter regiments, with about 120 fighters. The 921st (MiG-21MF) was based at Gia Lam/Bach Mai, the 923rd (MiG-17) at Kep, the 925th (with the new MiG-19) at Yen Bai, and the 927th (MiG-21) at Phuc Yen/Noi Bai, but most of the pilots were inexperienced and had little combat time. To guide these into combat the North Vietnamese had an excellent radar command and control network that was so dense it could not be knocked out.

When *Linebacker* began the North Vietnamese were stunned to find that their missile defenses over Hanoi were basically helpless against the Air Force chaff corridors. However, they quickly adjusted and used the MiG forces to attack the large, unwieldy Air Force formations. For much of *Linebacker* MiGs shot down more USAF F-4s than they lost MiGs, but they could never stop the attacks.

The Vietnamese were also unpleasantly surprised in their first dogfights with the Navy's *Top Gun*-trained F-4 crews, who racked up a 7:1 kill ratio against the MiGs. After more MiG losses to the Navy, the Vietnamese changed tactics and depended on SAMs and antiaircraft guns for defense against Navy strikes, and the Navy's air-to-air success eventually forced the Vietnamese to ground their MiG-17 regiment.

THE PRELUDE

PEACE TALKS AND THE EASTER OFFENSIVE

Prior to *Linebacker*, the 432nd Tactical Reconnaissance Wing (TRW) at Udorn was the closest base to Hanoi. It always kept four F-4Ds on alert to intercept North Vietnamese MiGs harassing US aircraft at night in Laos, and the *Combat Tree* F-4Ds were sent to Udorn for that purpose. (Author's collection)

North Vietnam

The North Vietnamese Politburo had been discussing a major conventional invasion of South Vietnam since the late 1960s. The *Tet* Offensive in 1968 was their first attempt at a major attack, though not a full-scale conventional invasion, and it had failed badly. Then in early 1971 the PAVN had inflicted a major defeat on the Army of the Republic of Vietnam (ARVN) during a large-scale South Vietnamese incursion into Laos, *Lam Son 719*. The failure of *Lam Son 719*, even though the PAVN lost over 20,000 troops to US and ARVN firepower, suggested the ARVN was weak enough that a major conventional offensive might have good results.

There had been two factions in the Politburo debating with what type of military action to continue the war, with one powerful faction that favored continuing the war at the current low level and another that preferred a new full-scale invasion of South Vietnam using the large number of tanks North Vietnam had recently received from the Soviet Union.

The latter faction was led by Defense Minister Vo Nguyen Giap, the hero of the victory at Dien Bien Phu in the spring of 1954 that had led to the French withdrawal from Vietnam. Even though Giap's reputation had been tarnished by the failure of the 1968 *Tet* Offensive, there were new factors that he and his supporters used to convince the Politburo to begin planning for an offensive in early 1972. First was the Nixon administration's *detente* overtures to both the Chinese and Soviets, North Vietnam's primary supporters, as the North Vietnamese were concerned their allies might sacrifice the relationship for *detente*. Secondly, the American withdrawal of combat forces, especially combat ground forces, from South Vietnam was proceeding rapidly. Once the ground forces were gone, there was no chance Nixon could bring them back. Thirdly, the Saigon government's internal pacification program was going well, and the Viet Cong were losing strength.

An invasion in early 1972 seemed to be feasible. By then American troop withdrawals would be almost complete and there would be a US presidential election on the horizon in the face of ever-increasing anti-war sentiment.

Nixon's trip to China and his meeting with Chairman Mao was a breakthrough in several ways, not the least of which was learning that the Chinese were willing to put their new relationship with the US ahead of supporting the North Vietnamese. (NARA)

The North Vietnamese began a massive build-up of forces beginning in mid-1971 while the final plan was developed. The Politburo decided to make a strong thrust from Cambodia to threaten Saigon along with two other attacks, a northern thrust across the DMZ and one into the Central Highlands that would threaten to cut the country in two. The offensive was named *Nguyen Hue*, after a famous Vietnamese general who had defeated an invading Chinese army in 1788.

Even though the campaign was to involve virtually all North Vietnam's 15 active divisions, it appears that the North Vietnamese goals were limited simply to undermining the confidence of the ARVN, gaining territory to have troops in place for an eventual settlement, and showing the United States that permanent support for South Vietnamese President Nguyen Van Thieu was a losing proposition.

United States

The North Vietnamese fears about *detente* were well founded. For President Richard Nixon and his National Security Advisor Henry Kissinger, the Vietnam War was an unpleasant but pressing issue that had to be dealt with while they were playing the long game of improving relations with China and the Soviet Union.

To paraphrase National Security Council staffer and later US Ambassador to China Winston Lord, the aims of establishing relations with China were threefold. Firstly, it would develop an opening to give the US more flexibility on the world stage. Secondly, playing the China card would catch the Soviets' attention and gain more leverage on them by stirring the Soviet Union's paranoia about China. At the same time, the US would make it clear that it would never get so engaged with China that it would amount to an anti-Soviet alliance. Thirdly, Kissinger and Nixon wanted to get help in resolving the Vietnam War. By having Nixon go to China in February 1972 and to Moscow in May 1972, the US hoped the North Vietnamese would see that the Soviets and Chinese were beginning to place a higher priority

RIGHT
The SA-2 was the backbone of the North Vietnamese air defense system. The bright spot of light is the missile engine from an SA-2 closing on a US reconnaissance aircraft. (Author's collection)

FAR RIGHT
The SA-2 had a 430lb fragmentation warhead that exploded into 8,000 fragments, visible in this picture as the missile detonates. The aircraft was damaged but escaped. (Author's collection)

on their bilateral relations with the US than on their dealings with their friends in Hanoi. By dealing with the Soviets and China, its two major patrons, they hoped to make Hanoi feel isolated and under pressure. Nixon and Kissinger hoped to get the Soviets and China to slow down the provision of aid to North Vietnam and encourage Hanoi to sign a peace agreement with the United States.

Warning signs

In mid-1971, the American side received indications that something serious was brewing. As always, the North Vietnamese took advantage of the overcast skies and monsoonal rains that began in May and lasted through October, weather which inhibited US air power from interdicting supply convoys along the Ho Chi Minh Trail that ran from North Vietnam through Laos to the South Vietnamese border. But American intelligence noted that this was a more massive build-up of supplies on the border of South Vietnam than normal and they also saw that the North Vietnamese had built more than 140 miles of new all-weather roads. Additionally, there was a large increase in the number of AAA (anti-aircraft artillery) guns concentrated around the staging areas near the passes through which infiltrators and supplies moved into South Vietnam.

Even more disturbingly, in past years virtually all SA-2 missile battalions had returned to the Hanoi and Haiphong areas at the beginning of the rainy season, but in 1971 they stayed in place, and by September additional SAM sites were reported near the passes. US intelligence now realized and reported that the build-up was much greater than in the past and might be the prelude to a full-scale invasion. At the end of 1971 US intelligence estimated that 96,000 PAVN troops were in Laos, 63,000 in Cambodia, and well over 100,000 inside South Vietnam.

MiG incursions

Additionally, since the summer of 1971 the Vietnamese People's Air Force (VNPAF) had been more aggressive. They deployed MiG-21 units to bases in North Vietnam's southern panhandle with more regularity and MiGs began to sweep down at night into Laos to threaten the large numbers of slow US aircraft gunships and light transports supporting the ongoing "secret" war between US-supported Laotian forces and the Pathet Lao supported by North Vietnam. They also began to make attempts to attack B-52s bombing the Ho Chi Minh Trail.

Red Crown was the Navy GCI ship, usually a guided missile cruiser or sometimes a guided missile destroyer, that stayed just off the coast of Haiphong and provided superb radar coverage from the coast all the way to Hanoi. It was the favorite control agency for the Air Force as well as the Navy. (US Navy)

The closest American base to the area, the 432nd Tactical Reconnaissance Wing (TRW) at Udorn RTAFB, responded to these moves by scrambling its F-4s from its alert pad, but the F-4s found themselves at a severe disadvantage because their radar could not detect the MiGs at low altitude.

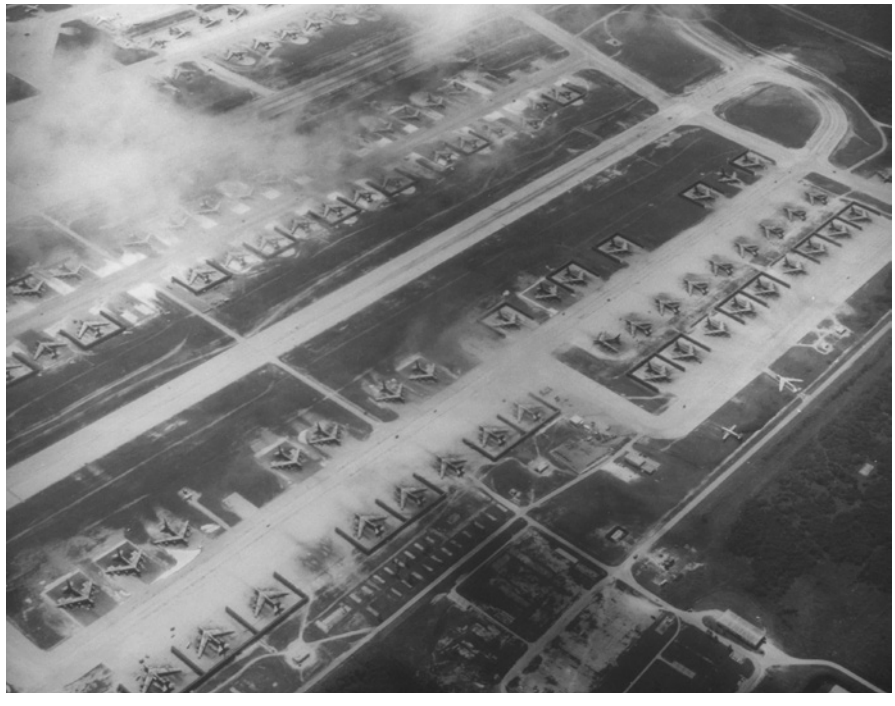
In response to this problem and to counter the increased MiG activity, in early December 1971 the Air Force sent eight F-4Ds equipped with the APX-81 *Combat Tree* identification, friend or foe (IFF) interrogator to Udorn.

IFF is a system whereby the positions of aircraft can be monitored through their transponders. A radar control facility (either airborne or on the ground) sends out an interrogation signal which is received by the IFF transponder on the aircraft. The transponder automatically responds to the query by generating a mark on the radar screen that identifies the aircraft, but in World War II the Allies had found that German military transponders could be exploited and compromised.

When the Soviet Union started to provide MiGs to Castro's Cuban Air Force, the US Air Force began to fly missions around the island using EC-121 *Warning Star* early warning aircraft to watch the MiGs and gather intelligence. The EC-121s gathered information on the Soviet SRO-2 transponders that the Cuban ground-controlled interception radars used to identify and control their fighters, and the US developed an IFF interrogator, the QRC-248, that could watch the MiG transponders.

The USAF used EC-121s for airborne radar control almost from the beginning of the Vietnam War, and in January 1967 a testbed EC-121 called *Quick Look* was sent to the combat zone to use the QRC-248 and see if North Vietnamese MiGs used the same transponder as the Cubans. They did, and the QRC-248 was soon mounted on all EC-121s and on Navy GCI ships, callsign *Red Crown.*

The Air Force developed a variant of the QRC-248, the APX-81, which could be attached to an F-4D radar. *Combat Tree*, or *Tree* as it quickly became known, could read the North Vietnamese MiG's SRO-2 transponder out to 60 miles, no matter what the MiG's altitude.



To accommodate the number of B-52s that President Nixon wanted at Andersen AFB, Guam, one of the runways had to be closed and used as a taxiway. This shows the closed runway lined with revetments full of B-52s. (USAF Historical Research Agency - AFHRA)

This was a huge leap forward for air-to-air operations because American radar had trouble tracking the small MiGs and the VNPAF doctrine required the MiGs always to be in contact with their GCI, while the Vietnamese GCI controller used the SRO-2 to know the position of his own aircraft at all times. *Combat Tree*'s deployment proved to be one of the most significant developments in the air-to-air war. With *Combat Tree*, 432nd TRW F-4Ds shot down several MiGs at night in late 1971 and early 1972.

Countering the build-up

The build-up put the Nixon administration in a difficult position. Not only had 58,000 troops left the country, but the United States had also withdrawn more than 400 combat aircraft from Southeast Asia and there were only two Navy carriers off the Vietnamese coast, instead of the four that were there during *Rolling Thunder*.

As the North Vietnamese supply build-up continued and the North Vietnamese MiGs became steadily more assertive, Nixon became more aggressive. Since 1965 B-52s had been involved in conventional bombing strikes, known as Operation *Arc Light*, more commonly called simply *Arc Light*, and now Nixon ordered more B-2 strikes against the build-up because the B-52s could bomb in all weather conditions, day or night. In late December he tried to send a stronger message to the North Vietnamese: on December 26, after a series of weather delays, the Air Force and Navy launched Operation *Proud Deep Alpha*, a five-day, 1,000-sortie bombing attack on supplies and air defenses in southern North Vietnam. Unfortunately, the weather was so bad that most of the strikes had to drop using an instrument bombing system, LORAN, and were not effective. As one official US Air Force history noted, *Proud Deep Alpha* was "beset with problems and disappointments from initial planning through final execution." The North Vietnamese reacted to the strikes by expanding and thickening their SA-2 missile network around the DMZ while continuing the build-up.

General John D. Lavelle, the commander of Seventh Air Force and thus all Air Force operations in Vietnam, made a liberal interpretation of Nixon's aggressive approach and mounted a vigorous campaign against the missile sites, but amazingly in late March 1972, just

The Vietnamese Air Force (VNAF) used small O-1 aircraft for forward air control missions, but unlike an American FAC the controller was not the pilot but an observer in the other seat. (Curimedia/CC-BY-2.0)

before the North Vietnamese attack, he was called back to Washington by Air Force Chief of Staff John D. Ryan who said he had overstepped his authority and summarily fired him. Ryan's action dismayed Nixon and Secretary of Defense Melvin Laird, who had informally encouraged Lavelle to mount the attacks, but given the political climate they could say nothing.

More air power

To further counter the build-up, Nixon ordered a massive aircraft redeployment that would eventually more than double the number of Air Force and Navy aircraft in Southeast Asia by May 1972. The movements began on December 29, 1971 when 18 F-4s moved from the Philippines to Korat RTAFB and six to Ubon RTAFB under Operation *Commando Flash*. In February 1972 more B-52s were sent from the US to the main B-52 base, Andersen AFB on Guam, while others were moved from Andersen to U-Tapao air base in Thailand, a very short flight from the combat zone, so that they could fly more sorties.

On February 14 the Air Force stopped B-52 bombing missions in Laos and resumed the B-52 raids supporting ARVN forces inside the borders of South Vietnam, as well as increasing the sorties from 1,200 to 1,500 per month.

The new B-52 bombings did not stop the deployment of enemy forces but did delay the PAVN's timetable. Hanoi slipped the start date for the invasion until the end of March and, to take advantage of shorter supply lines, shifted the primary front from MR III near Saigon to MR I next to the DMZ.

The US ground commanders, meanwhile, were not asleep. While the United States was removing all its ground forces, the US advisory command and air forces remained in place. The senior US commander in Vietnam, General Creighton Abrams, recognized the North Vietnamese build-up in the fall of 1971 and realized that US air power, and particularly the power of B-52 *Arc Light* missions inside South Vietnam, would be the key. With fewer than 10,000 US combat troops remaining in South Vietnam and most scheduled to leave within the next six months, in the event of an invasion his plan was to use the North Vietnamese offensive as an opportunity to focus US firepower and inflict overwhelming damage on the PAVN. He planned to use the B-52s as his mobile reserve and the US advisors as his eyes to break the impending North Vietnamese onslaught. This was to prove prescient.

During the first months of 1972 the North Vietnamese made full use of the cloudy but dry northeast monsoon to move supplies into stockpiles near jump-off positions, but

after *Proud Deep Alpha* the United States only sporadically attacked the North Vietnamese build-up, much to the distress of US military leaders. This was because Nixon and Secretary of State Henry Kissinger had been conducting a new, secret round of peace talks with Hanoi, hoping to end the war before the United States finished its promised withdrawal from South Vietnam. Nixon also wanted to focus on other foreign policy issues, especially the upcoming visit to Peking in mid-February 1972, and a planned visit in May to Moscow, so he and Kissinger took the calculated risk that they would be able to complete the negotiations before the North Vietnamese took military action.

Still, while the actual attacks declined the Nixon administration was not backing down militarily. It was politically impossible to send ground troops back, so as the North Vietnamese build-up continued the United States began sending more aircraft to the region, the trickle of replacements soon became a flood under various names, notably *Constant Guard*, and even more B-52s were sent to Guam.

Guam was as close as newly deployed B-52s could get, since U-Tapao was full and the Kadena air base on Okinawa could no longer be used as a B-52 base, because Nixon had agreed that Okinawa would revert to Japanese control in May. The Japanese would permit tankers, but not bombers, to operate from Kadena.

ARVN ground forces

South Vietnam was divided into four military regions: MR I, the northern section of the country near the DMZ; MR II, the Central Highlands; MR III, the area between Saigon and the Central Highlands; and MR IV, the Mekong delta south of Saigon. On the eve of the invasion, the ARVN had 11 infantry divisions, 58 artillery battalions, and 19 armor battalions, backed up by about 550,000 men of the Regional Forces, but this numerically impressive force faced a number of structural problems, which showed up most noticeably in MR I, just south of the DMZ. Eighty thousand US troops had been replaced by 25,000 ARVN troops, which had considerably thinned the lines, and these ARVN troops had been focused almost exclusively on counterinsurgency rather than conventional war fighting. This had worked well for many years and had greatly improved the pacification program between 1968 and 1972, but these ARVN troops – in fact, the entire ARVN – were not prepared for a full-scale attack backed up by a large number of tanks. Additionally, because much of the burden of the fighting had been borne by American troops and their leaders, the ARVN combat leadership varied widely and many senior officers, though certainly not all, had been selected for their political connections.

Another structural problem was that the North Vietnamese system used to supply the Viet Cong also allowed the North Vietnamese invasion force to build up large supply areas close to the border in many parts of South Vietnam, thus allowing them to supply attacks on several fronts and to threaten to divide the relatively slender country.

Finally, and perhaps most importantly, in the military region closest to the DMZ, MR I, the tactical air control system (TACS) that controlled tactical airstrikes had been taken over by the Vietnamese Air Force (VNAF) at the end of 1971 (the transfer of the TACS south in MR II and III was not scheduled to take place until June 1972). The consequences of this were enormous, because to be effective tactical airpower must be controlled. It requires a central command-and-control organization where the strikes can be sequenced, and a forward air controller (FAC) in communication with the strike aircraft to put their eyes on the target. One American FAC put it succinctly: "If you haven't got that, you're going to wind up bombing trees." The Vietnamese TACS in MR I used FACs both on the ground and in the air to guide in tactical airstrikes but, unlike American FACs, VNAF FACs were not pilots but observers who flew alongside inexperienced pilots in O-1 light planes. These FACs were considered of very poor quality.

THE CAMPAIGN

War therefore is an act of violence to compel our opponent to fulfil our will.
Carl von Clausewitz

The blow falls: the North Vietnamese invasion

Nixon and Kissinger's gamble – that they could complete peace talks with Hanoi before a North Vietnamese invasion – failed. On March 23 the US canceled the peace talks in Paris due to the lack of progress. On March 30, 1972 the North Vietnamese began a massive, sequenced three-pronged attack into South Vietnam, known as *Nguyen Hue*. For the first time the conflict turned into a real conventional war involving practically all the North Vietnamese Army – 12 of their 15 regular divisions comprising 150,000 troops, and virtually all their tanks. Only one division was left in the North, while two were held in reserve in Laos. There were three main thrusts to the invasion: one in the north across the DMZ and MR I, and from Laos, aimed at the town of Quang Tri; one into the Central Highlands of South Vietnam from Laos to capture Kontum; and one from Cambodia, only 80 miles north of Saigon, to take the city of An Loc.

Naval gunfire support, especially in MR I, was critical during the first week of the Easter Offensive when weather grounded tactical air forces. Ships' guns were much more accurate and powerful than land-based artillery. (US Navy)

Unfortunately, most of the US air power was grounded by the bad weather during the first days of the invasion, much to the frustration of the White House. As the North Vietnamese successes mounted, one Nixon administration official declared that "our Air Force consisted of delicate machines only capable of flying in a war in the desert in July" and caustically suggested to the Air Force leadership "that if they could not fly perhaps they could taxi north for twenty-five miles."

Nixon demanded that more B-52s be sent to the combat zone to step up the air attacks but Laird and the Air Force balked. All the B-52D models were already in the theater and any more B-52s sent from the US would cut down on the number of B-52s on nuclear alert. Additionally, the only B-52s available – the B-52G – carried only 27 bombs, about a quarter

of what a D model carried. Nixon was furious at the delay, and told Haig and Kissinger in early April:

> I want more B-52s sent to Vietnam. I want this order carried out, regardless of how many heads have to roll in carrying it out. Even though the bomb load [of the G model] is smaller … the psychological effect of having 100 more B-52s on the line would be enormous. I either expect this order to be carried out or I want the resignation of the man who failed to carry out the order when it was given.

Needless to say, soon 66 B-52Gs were on their way to Guam under Operation *Bullet Shot*. By the end of May over 200 B-52s and almost 300 crews were in Southeast Asia, capable of flying about 105 sorties a day and more for short periods.

America's objectives

The United States not only wanted to stop and then push back the North Vietnamese invasion, but also to destroy as much of the PAVN as possible, to force the North Vietnamese back to the negotiating table. They set about doing this by launching massive air attacks directly against the PAVN field armies. The most effective weapon against the PAVN was the B-52, but just after the invasion began, President Nixon wanted to use these only to directly attack North Vietnam. The American ground commanders were afraid that without the B-52s they would lose the war on the ground and complained loudly about this to the CJCS, Admiral Thomas Moorer, who passed on their annoyance to Secretary of Defense Melvin Laird. By the end of April, Nixon agreed to use the B-52s only in South Vietnam.

MR I

The first phase of the *Nguyen Hue* invasion was the attack in the north, MR I, where the Americans and the South Vietnamese had not expected a large-scale direct crossing of the DMZ and were caught badly off guard. Two PAVN divisions attacked across the DMZ between North and South Vietnam and a third division moved east from Laos, spearheaded by T-54/55 tanks and 130 mm artillery pieces they had obtained from the Soviets and the Chinese. The PAVN forces quickly defeated the ARVN troops they met and moved down the coastal highway towards the city of Quang Tri.

The United States appeared to be in an excellent position to deliver overwhelming tactical air support for the ARVN and began the Operation *Constant Guard* series of deployments; 176 F-4 Phantoms and 12 F-105Gs from bases in the Republic of Korea and the US moved to Thai air bases between April 1 and May 11.

At the beginning of 1972 the US Air Force had three squadrons of F-4s and a squadron of A-37 Dragonflies at the huge American base at Da Nang just south of the DMZ, and with the invasion more tactical airpower flooded in. On April 1 nine more F-4s arrived, followed on April 6 by four Marine squadrons – three F-4 and one A-6, as well as six two-seat TA-4F Skyhawks for forward air control – all devoted to close air support. The proximity of Da Nang to the battle made it an ideal place to support the surge in support of MR I and allowed American and VNAF aircraft to attack, return to refuel and rearm, then take off and quickly attack again. There were also two Navy carriers in the region which added their squadrons of tactical aircraft. Not only was there plenty of tactical airpower available, but the B-52s could be used day or night in almost all weather conditions.

As bad weather continued to limit the amount of tactical air support that could be used to counter the advance, gunfire support from US Navy ships offshore helped make up for the lack of air power. The Navy deployed 60 surface combatants, organized into small units of three destroyers or a cruiser and two destroyers, along the coast of South Vietnam and

The Soviet-supplied 130mm artillery piece, of which the North Vietnamese had over 500, was the best in the world in 1972. It significantly outranged the South Vietnamese 155mm US-provided artillery and allowed the PAVN to dominate artillery duels. (AFHRA)

these ships bombarded PAVN columns, transshipment points, supply choke points, and other lines of communication. This naval bombardment support was critical to the South Vietnamese defenders, especially during the pivotal first days of the offensive in MR I, when bad weather severely hampered tactical aviation.

As the weather cleared the Vietnamese TACS had to handle hundreds of US, English-only speaking pilots who were trying to strike the PAVN forces, and the TACS broke down. The VNAF forward air controllers were inept, unlike experienced American FACs, and could not effectively coordinate air strikes. To add to the problems for air strikes, the North Vietnamese had moved a number of SA-2 battalions to the DMZ and large numbers of antiaircraft guns to aid the attack. They immediately began to engage American aircraft, even damaging a B-52 on April 8. The Air Force brought in FACs from other regions, but they were handicapped by communications problems with the Vietnamese TACS and FACs, as well as not knowing the local terrain.

The US was able to provide tactical air support using the surge capability of the US Seventh Fleet's carrier force which helped in preventing a total collapse of MR I during the first month of the invasion. The Navy, using the same control system for controlling air

The A-37 Dragonfly was a close support aircraft adopted from a US Air Force basic trainer and used by both the USAF and VNAF. The one US squadron stationed at Da Nang did yeoman work from the beginning of the invasion in MR I and was especially effective attacking PAVN forces since it could often work under the clouds in bad weather. However, its relatively low performance required it to work at low altitude and made it vulnerable to all calibers of AAA and especially to the SA-7. (USAF)

Air base
Ho Chi Minh Trail
Easter Offensive primary thrusts
NORTH VIETNAM
Yen Bai
RP V (USAF)
RP VI A (USAF)
Phuc Yen
Kep
Hanoi
RP VI B (USN)
Haiphong
BURMA
RP IV (USN)
Gulf of Tonkin
Red Crown
LAOS
RP III (USN)
Vientiane
RP II (USN)
Mu Gia Pass
RP I (USAF)
Ban Karai Pass
4 Divs
Udorn
Nakhon Phanom
Yankee station
DMZ
Khe Sanh
QUANG TRI
Hue
THAILAND
2 Divs
Da Nang
1 Div
MR I
Takhli
Korat
Ubon
South China Sea
2 Divs
Bangkok
CAMBODIA
SOUTH VIETNAM
MR II
U-Tapao
3 Divs
An Loc
Phnom Penh
MR III
1 Div
Tan Son Nhut
Bien Hoa
Gulf of Thailand
1 Div
Saigon
Dixie station
MR IV
N
0
100 miles
0
100km

OPPOSITE: VIETNAM DURING *LINEBACKER*

strikes it used for controlling gunfire, launched 2,023 tactical airstrikes into MR I during the early weeks of the campaign.

The PAVN forces pushed steadily ahead and on May 1 the ARVN abandoned Quang Tri, giving the PAVN its first major victory of *Nguyen Hue*. To try to salvage the situation, President Thieu replaced his MR I general, Hoang Xuan Lam, with one of South Vietnam's ablest generals, Ngo Quang Truong, the commander of the victorious defense of Hue during the 1968 *Tet* Offensive. Truong was widely considered one of the most honest and capable generals of the South Vietnamese army and his arrival changed the entire dynamic of the battle. Truong was aided by clearing weather and the arrival of more American air power, which helped stop the PAVN advance on May 2. To further obstruct the PAVN, Truong ordered the destruction of every bridge between the DMZ and his defense line on the My Chanh River just north of Hue. General Truong consolidated his forces, and in June a USAF TACS and American FACs in O-2s were reintroduced to MR I. With the assurance that he would have overwhelming and well-controlled close air support, General Truong developed a plan to retake the province.

Unfortunately, much of the close air support counted on A-37s, helicopters, and propeller-driven A-1s and the PAVN now had large numbers of antiaircraft weapons as well as a new air defense weapon that was an unpleasant surprise to the American and South Vietnamese air forces, the hand-held SA-7 *Strella* heat-seeking missile. The SA-7 was an unsophisticated system – the "Saturday night special" of SAMs – but it was very effective against slow-moving aircraft, especially helicopters and the propeller-driven South Vietnamese A-1 Skyraiders. Its biggest impact was on the FACs who flew slow light planes close to the ground to identify targets and guide in air strikes. The SA-7 forced them up to much higher altitudes where it was much more difficult to locate targets and guide in air strikes.

The first SA-7 victim was an American O-2 FAC on May 1, and when the search and rescue aircraft arrived another SA-7 shot down an American A-1. The next day SA-7s downed two more A-1s. During the next few months SA-7s also downed numerous helicopters during the assault, including a CH-53, killing 47 troops, as well as numerous AH-1 Cobras and UH-1 Hueys, and the missile was credited with a very high hit rate, over 13 percent.

General Truong launched his counteroffensive, *Lam Son 72*, on June 28, and as planned during July American aircraft flew almost 5,000 tactical sorties and over 2,000 B-52 strikes to support the operation.

Initially the offensive went well, but unfortunately General Truong's plan to bypass the heavily dug-in PAVN forces in Quang Tri city was overruled by the South Vietnamese President, Nguyen Van Thieu; it took a long and bloody battle before the city was retaken on September 15, and this stalled General Truong's final push.

MR II Central

From the beginning of 1972, the US had detected and had been trying to disrupt the PAVN build-up in the Central Highlands using B-52 strikes, with more than 80 of those in February alone. Still, on April 2 the PAVN launched a series of small probes and then, with the battles in MR I and MR III underway, on April 4 launched several progressively larger-scale attacks, culminating on April 12 with the third major thrust of *Nguyen Hue*. The PAVN pushed from Cambodia into the Central Highlands with three divisions, heavy artillery, 400 tanks and, for the first time, the AT-3 *Sagger* wire-guided antitank missiles. The aim was to seize Kontum and threaten to split the Republic of Vietnam in two by joining forces with Viet

ABOVE LEFT
American FACs (forward air controllers) used the O-2 Skymaster for their missions, using smoke rockets like the one seen on the left side of the picture to mark a target for fighters. The O-2, while slow, had a better performance than Vietnamese O-1s and the O-2 usually carried just one person, while the VNAF O-1s carried two, a pilot and an observer. (National Museum of the USAF)

ABOVE RIGHT
The Soviet-supplied SA-7 *Strella* heat-seeking missile system was the biggest danger to FACs and helicopters. (DoD)

Cong units already operating along the coast.

Unfortunately for the PAVN forces, in this area the PAVN did not have the sophisticated air defenses – SA-2s and SA-7s – that they did in other areas, so US air power had fewer threats and thus more freedom to operate.

The US harried the PAVN units with tactical air and gunships (when the weather permitted) and B-52 strikes and, as on the northern front, the Navy made a significant contribution to the MR II air effort during the vital first weeks of the attack. But despite the air attacks the PAVN advance continued, and on April 23 a major PAVN thrust towards the towns of Dak To/Tac Canh caused a surprise collapse of two ARVN regiments; the fleeing ARVN troops left the enemy 23 105mm and l55mm artillery pieces, ten M-41 tanks, and 16,000 rounds of artillery ammunition. The collapse of the ARVN was a shock to the American advisors, and a US report noted: "One could not cite material problems for ARVN's failure to counter the PAVN threat at Dak To/Tan Canh."

However, the PAVN's quick success seemed to have surprised the PAVN commanders as much as the American advisors. To the relief of the American officers, the PAVN did not exploit that success and immediately move on Kontum, which at that point was almost undefended. As ARVN troops and their American advisors fell back, Kontum was quickly reinforced with not only troops but also an experienced American tactical air control party, and from April 23 air power covered the retreat. One major asset was the gunship, both the AC-130 and AC-119, and in 1972 there were over two dozen AC-119s and AC-130s in Southeast Asia. The gunships' fire was very accurate, and they could loiter for prolonged periods over the battlefield and support allied forces day and night, operating above small-arms fire. Both types had been used to attack trucks along the Ho Chi Minh Trail at night before being sent to South Vietnam to counter the invasion, and both also had sophisticated low-light television and infrared night vision devices. The AC-130 also carried 40mm cannon which made it especially deadly. In early 1972 one AC-130 was upgraded with a very accurate 105mm howitzer and called *Pave Aegis*, giving the aircraft a high-powered artillery piece.

The defenders also had an advantage with an experimental weapons system, the XM-26 tube-launched, optically tracked, wire-guided (TOW) antitank missile mounted on a UH-1 Huey helicopter. The air-launched TOW had been canceled during development, but two of the experimental systems were reconstructed and rushed to South Vietnam in late April 1972, where they were flown into Plieku and designated as the 1st Combat Aerial TOW

The A-1 Skyraider was originally a US Navy aircraft, but the USAF and VNAF used them because they could carry a heavy load, as seen here. However, they were very vulnerable to SA-7s. (Dirck Halstead/Liaison/Getty)

Team, Vietnam, "Hawk's Claw." The Huey pilots had never fired a TOW missile before, but the Huey–TOW combination proved easy to use and scored four tank kills on May 2. In the next several weeks, the two Huey gunships flew numerous sorties in the area around Kontum, knocking out tanks, armored vehicles, trucks, artillery pieces, and other point targets.

The PAVN continued to delay their attack on Kontum, giving the defenders a chance to reinforce and dig in and to continue to pound the PAVN with air strikes. During April, over 3,400 Air Force, Marine, and Navy sorties struck targets in the MR II area, and on May 12 alone, 78 strikes hit the PAVN forces.

On the night of May 13/14 the PAVN attack on Kontum finally began, and the city was quickly surrounded. From this point on, the defenders had to depend on airlift landing on the small strip for supplies, and that proved hazardous. On May 15 PAVN artillery destroyed two VNAF C-123s, one of which was loaded with ammunition, and the resultant explosions cratered the runway and forced its closure.

On May 17 a USAF C-130 crashed, killing seven US personnel and again closing the runway, and at that point fixed-wing aircraft traffic was restricted to the hours of darkness and landings were now at the pilot's discretion. The C-130 operation into Kontum airfield

Gunships like this AC-130 were, along with B-52s, the most efficient ground support system in the theater. Carrying heavy armament including 40mm cannon combined with low-light TV and infrared sights, their fire was extremely accurate. They had been mostly used on the Ho Chi Minh Trail in Laos but were very effective in the troop support role during the invasion. (USAF)

Wire-guided antitank missiles were a technological breakthrough used by both sides in 1972, the Soviet ground-launched *Sagger* by the PAVN and the TOW (tube-launched, optically tracked, wire-guided) by the Americans. The American missiles could be launched from the air and were especially effective when fired by the small detachment of "Hawk's Claw" missile-equipped UH-1 Huey helicopters defending Kontum. They destroyed not only tanks but many other small targets. (Bettmann/Getty)

resumed on the night of May 18/19, although incoming artillery of various types and the high AAA threat made this run extremely dangerous. On May 20 Kontum airfield was rocketed, destroying another VNAF C-123 on the ramp. Still, the C-130 resupply missions escorted by gunships averaged about 17 a night for the last two weeks of May, but often the PAVN rocket attacks closed the small runway.

The North Vietnamese began their final attack on Kontum on May 25. The ARVN had no artillery and had to depend on tactical air, B-52 strikes and gunship sorties to repulse the three-day attack; while some North Vietnamese units filtered into the city,

The C-123 was the mainstay of the VNAF fixed-wing airlift fleet but lacked the capability of the American C-130. The C-130 was considered too complex for the VNAF to maintain. (USAF)

A classic picture of a B-52D dropping its 108 bombs in Vietnam. The bombs coming out in a steady stream from the rear bomb bay are Mk.82 500lb bombs, while the few dropping in the front are Mk.117 750lb bombs carried externally. (USAF)

the ARVN held.

On May 26, PAVN tanks and infantry attacked again, but one observer on the scene stated that the PAVN must have had a "sorry weatherman," for just as the PAVN attack rolled into high gear at dawn the weather broke and allowed tactical air and TOW-equipped Huey helicopters to engage the enemy armor. During May 26 and 27 these "Hawk's Claw" UH-1B/TOW aircraft played a critical role in blunting the tank assaults. At dawn each day the TOW helicopters were on station to knock out tanks and point targets inside the city. They expended 21 missiles during several hours of continuous operation and scored nine tank kills – every tank they found – as well as destroying other targets, including a machine gun on a water tank. By the night of May 27/28 the PAVN

The AC-119 was a less sophisticated but still effective gunship used by both the USAF and VNAF. Early versions were armed only with 7.62mm M134 miniguns, and later versions added M61 20mm cannon. (USAF)

The CH-47 Chinook was the backbone of the VNAF heavy-lift helicopter units, and CH-47s are still in use today by the US Army. This Chinook was photographed preparing to depart the besieged town of An Loc on April 7 after offloading its supplies. The picture was taken before PAVN antiaircraft fire made it impossible for helicopters to fly into An Loc. (Bettmann/Getty)

held half the city and the ARVN were unable to evict them, but the PAVN forces found themselves too weak to expand.

On May 28 bad weather grounded much of the tactical air, so the B-52s took over. The B-52s were under a very flexible control system that allowed them to fly into the combat area without a pre-planned target and then be picked up on American radar and controlled by a radar-guided bombing system, *Combat Skyspot*. The B-52s flew in a three-ship cell and the cell leader radioed data such as its airspeed and heading to the radar site as it approached the target area. The radar site's computer would solve the bomb aiming problem and as the cell approached the target the site personnel verbally transmitted guidance commands to the aircraft crew by radio. Both the site and aircrew were authorized to "withhold" release at any point if doubt arose. All communications were tape recorded by the aircrew for post-strike debriefing. In South Vietnam, where the B-52s were close to the *Combat Skyspot* radar site, this had proven to be extremely accurate. The US had developed confidence in the use of B-52s in close quarters at the battle of Khe Sanh from January 21 to July 9, 1968, even though their "box" – the area where the bombs landed – was approximately ⅝ mile wide by 2 miles long. On May 28 – albeit with some trepidation – US advisors brought the B-52 strikes to within 700 meters of the friendly lines, and the delivery was perfect.

On May 29 the PAVN attacks ended. The ARVN troops were unable to dislodge the PAVN with air strikes alone, so the ARVN launched a week of ground assaults to clear the city, and by June 5 the city was fully in ARVN hands and the siege of Kontum was over.

Air power was mainly responsible for the PAVN defeat. Between May 14 and June 8, 300 B-52 *Arc Light* missions alone dropped millions of pounds in explosives in support of Kontum. Additionally, the C-130 crews deserved much of the credit for the victory. During the 40 days between May 22 and June 30 they made 95 air drops and 284 landings at Kontum, providing the ARVN with the rations and material needed to hold the city.

The gunships were also a vital part, though initially they experienced some problems with FACs who did not fully understand the AC-119's and AC-130's versatility and capability. This was hardly surprising, since the gunships' primary area of operations had been in Laos and Cambodia prior to the 1972 offensive in South Vietnam.

While the TOW-armed UH-1 Hueys were more efficient, the much more numerous AH-1G Cobras were very effective in the close quarters of An Loc. Here is a North Vietnamese tank knocked out by an AH-1 Cobra attack in a narrow street. (NARA)

The battle in the south: MR III and the siege of An Loc

On April 2 the PAVN attacked MR III from the Cambodian sanctuaries with three infantry divisions – one North Vietnamese and two Viet Cong – artillery and tanks. The PAVN first attacked the town of Loc Ninh, a small district town in Binh Long Province near the Cambodian border. ARVN troops and US advisors, with the help of US FACs, held the town for three critical days before withdrawing. The PAVN then aimed for An Loc, the provincial capital of Binh Long Province, 60 miles north of Saigon.

The North Vietnamese seemingly could not have picked a better time to attack in MR III. Since the drawdown of American troops had begun in 1969, the region had seen US combat units dwindle to almost nothing, but unfortunately for the PAVN, An Loc was a battle the Americans were prepared for and anxious to fight, one where air power would be the dominant force.

While holding at Loc Ninh under a canopy of B-52 strikes the ARVN frantically continued reinforcing An Loc, and the three days it took the PAVN to capture Loc Ninh allowed reinforcements to be brought in to An Loc before the town was surrounded. VNAF CH-47 Chinooks, though limited to a single landing zone, completed 42 sorties, each bringing in approximately 3½ tons of supplies. Some of the Chinooks were hit as they hovered for the few seconds it took to dump their cargo, but none were shot down.

On April 12 the PAVN overran An Loc's only airstrip at Quan Loi, located a mile and a half east of the town. With the airfield lost, the defenders now depended on air drops for all their supplies. PAVN forces now launched the initial assault on An Loc, and by April 13 they occupied the northern half of the city and began to move an antiaircraft regiment immediately outside the An Loc defensive perimeter. The PAVN now controlled all key terrain around the city and renewed their assault on April 19. This second battle raged from April 19–22, but the ARVN, without artillery or tanks but with heavy air support, repelled the attackers.

The air support was possible because in An Loc, unlike in MR I, the TACS was US-operated. To hold the line, US ground advisors, US FACs, and their South Vietnamese counterparts met every day at the TACS and planned B-52 and tactical airstrikes for the following day on suspected enemy troop locations and along avenues of attack. B-52s were used against

The three squadrons of the 49th TFW flew from Holloman AFB, New Mexico, to Takhali RTAFB, Thailand, and were in combat the next day. Most of their early missions were to An Loc, staging out of and returning to Bien Hoa air base in South Vietnam. (USAF)

the staging and assembly areas while US and VNAF tactical air delivered air strikes closer to the perimeter. US and Vietnamese FACs worked hard to coordinate the wide variety of jet fighter bombers, AH-1 Cobra attack helicopters, fixed-wing gunships, and especially B-52 strikes, which were difficult because they required the target area to be cleared. This organization of the US-operated TACS explains the success of air power at An Loc and the failure of CAS/BAI (Close Air Support/Battlefield Air Interdiction) missions in the opening phases of the defense of MR I.

US advisors were able to increase the number of sorties over An Loc by using the base at Bien Hoa for rearming and refueling tactical aircraft from carriers and airbases across Thailand and South Vietnam, missions known as "Bien Hoa turns." In early May the entire 49th TFW from Holloman AFB, New Mexico – 72 F-4Ds – began to deploy to Takhali RTAFB, Thailand, formerly a major American fighter base.

Before the F-4s arrived, on May 5 about 35 members of an American advance party went to Takhali to prepare the facility for reopening and activation, but they discovered that after the Americans had left the locals had pillaged the base. Virtually all the electrical equipment, plumbing (including water heaters) and light fixtures were gone, the housing "hooches" had been ransacked, and there was no potable water so drinking water had to be trucked in from Korat every day. Still, they set to work and when the 49th arrived a few days later its F-4s began flying combat sorties almost immediately.

Because of a long-standing agreement with the government of Thailand, Thai-based US aircraft could not fly out of Thailand, bomb South Vietnam and return to Thailand. To fly close air support missions in MR III, the 49th TFW aircraft – and many other fighter units in Thailand – would take off from their Thai bases with a full load of bombs, attack PAVN units around An Loc, then land at Bien Hoa air base about 20 miles east of Saigon. There they would refuel, rearm, strike PAVN units again and then return to their bases in Thailand.

Two Marine A-4 squadrons that specialized in close air support were rushed to Bien Hoa air base, Vietnam, on May 11. They also brought with them two-seat TA-4Fs to act as fast FACs. (Photo by David Hume Kennerly/ Getty Images)

By now the PAVN controlled all key terrain around An Loc with seven infantry regiments, an artillery division, and a tank regiment. They renewed their assault on April 19 and this second battle raged until the 22nd, but the ARVN, without artillery or tanks but with heavy air support, repelled the attackers.

After another long pause the PAVN made their final attempt to capture An Loc on the morning of May 11, but this last PAVN assault collided with the heaviest and best-orchestrated aerial fires of the campaign. B-52s attacked as the PAVN push began and one B-52 cell struck every 55 minutes for the next 30 hours, while a flexible command and control system allowed changes in pre-planned targets while the B-52s were on their way to An Loc. To maximize the effects of the B-52 *Arc Light* strikes, the US advisors cleared strikes to within 600m of the perimeter. Tactical aircraft from Bien Hoa also struck the PAVN hard, flying nearly 300 sorties into An Loc on May 11 alone, through heavy antiaircraft fire and losing four aircraft.

The PAVN made two significant penetrations of the perimeter in an attempt to link up in the center of the city. The penetrations were too narrow for effective air strikes, but the AC-130 Spectre *Pave Aegis* gunship with its 105mm howitzer destroyed many of the tanks and gave the ARVN time to establish defensive positions.

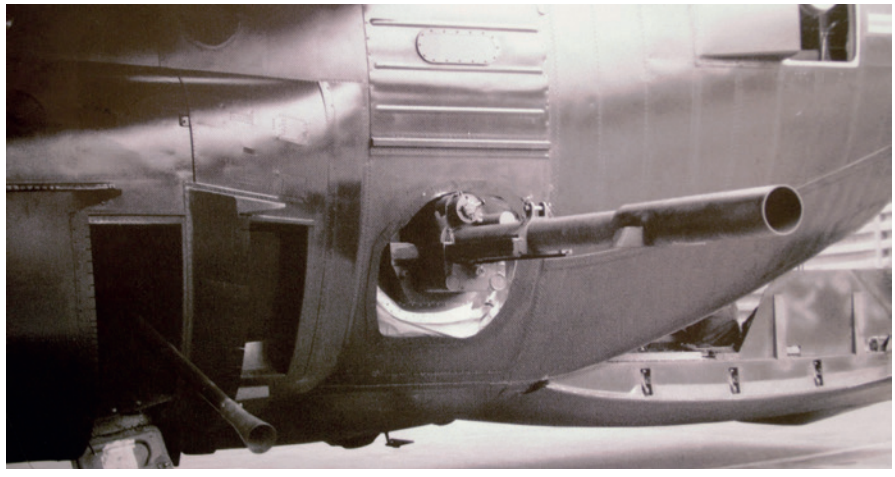
Over the next four days there were an average of 260 tactical air sorties a day into An Loc to hammer PAVN units and assembly areas, and this firepower stopped the last PAVN push.

By now both sides' ground forces were exhausted, and stayed in their positions until the end of the year.

The most critical thing: supplying An Loc

While the combat raged in the city, it was clear that only an air resupply effort would make it possible for An Loc to survive a long siege. Because of the defenses, from the beginning of the siege only fixed-wing cargo planes, not helicopters, attempted the dangerous flight into An Loc.

VNAF crews and transports, primarily C-123s or large, vulnerable C-119s, made their first drops on April 12 during daylight but the drops were difficult because of enemy fire and the tiny (219 square yard) drop zone (DZ). The transports generally approached An Loc from the south, flying along the main road, Route 13; they usually flew in three-aircraft formations and released their loads from 5,000ft or higher to avoid PAVN antiaircraft fire. The VNAF



One AC-130 was equipped with a 105mm howitzer under the *Pave Aegis* program; the gun was extremely accurate and had a very long range. The shells were 31in, 42lb 105mm rounds and the cannon could fire 0–20 degrees aft in azimuth and 0–40 degrees depression. The first *Pave Aegis* AC-130 was shot down on March 30 and a replacement operated through all of April. On the night of April 23, the *Pave Aegis* system destroyed or damaged five tanks in the Kontum area, and a US veteran of 53 days at An Loc said the *Pave Aegis* was the single most effective weapon used at An Loc. (AFHRA)

crews used makeshift sighting devices or simply guessed where to drop their cargo, so drops were usually off-target and landed outside the defensive perimeter where they were gobbled up by the PAVN. During the first three days of the siege (April 12–14) the VNAF made 27 drops but only 34 tons of the 135 tons dropped were recovered.

The PAVN soon had all avenues of approach covered with 12.7mm, 23mm, 37mm, and 57mm AAA fire and used an early warning network of spotters to notify the firing units of incoming aircraft. During the first drops on April 12 six transports were hit, on April 15 a VNAF C-123 was shot down, killing all aboard, and another VNAF C-123 was lost on April 19. At that point aerial resupply became the sole domain of USAF C-130s from the 374th Tactical Airlift Wing flying out of Saigon's Tan Son Nhut air base. However, the 374th only had a handful of C-130 crews with significant tactical air drop experience. The decline in combat activity during the preceding two years had made the C-130 force primarily a "milk run" organization that flew back and forth to fixed bases, so many crews were not tactically qualified, and most of those who had qualifications had no recent experience. In fact, the entire C-130 force had suffered because the experienced crew members who had fought earlier in Vietnam had either retired or been transferred out of the tactical mission, leaving only a few experienced crews to bear the burden of making the tactical drops at An Loc.

On April 16 two C-130s tried a new tactic, coming in at ground level and climbing to 600ft to drop, but the pilots misidentified the drop and once again no supplies were delivered. On April 18 two of the first four USAF C-130s sent to An Loc using a Computerized Aerial Drop System (CARP) made their first run at dawn. For the CARP, no instruments were needed; pilots simply followed Route 13 from the south and circled the city until a FAC signaled them to start their run. As they approached the soccer-field size DZ, in the southern part of An Loc, the computer took over, releasing the supplies at a prearranged point.

The first airplane dropped on the DZ at 600ft and escaped with only slight damage. The second C-130 decided to surprise the enemy with an approach from a different direction but was hit and heavily damaged, and limped back on two engines and crashed. The other two aborted the mission, and none of the supplies dropped by the two first two transports landed where they could be recovered, so CARP was discarded.

At this point two C-123s and one C-130 had been shot down and no supplies had been delivered. With the heavy defenses, it was clear that the supply efforts might fail, but fortunately the requirements – originally put at 200 tons a day – were reduced. The original highest priority had been 105mm howitzer rounds, but PAVN artillery had destroyed all the ARVN artillery so the shells were not required. Water requirements also eased when a series of brackish wells were found inside the perimeter, so a new minimum was set at 65 tons per day.

The unsung hero of An Loc and Kontum (and many earlier battles) was the C-130, even flown by inexperienced crews. They suffered heavy losses but changed tactics and arguably saved both areas. (USAF)

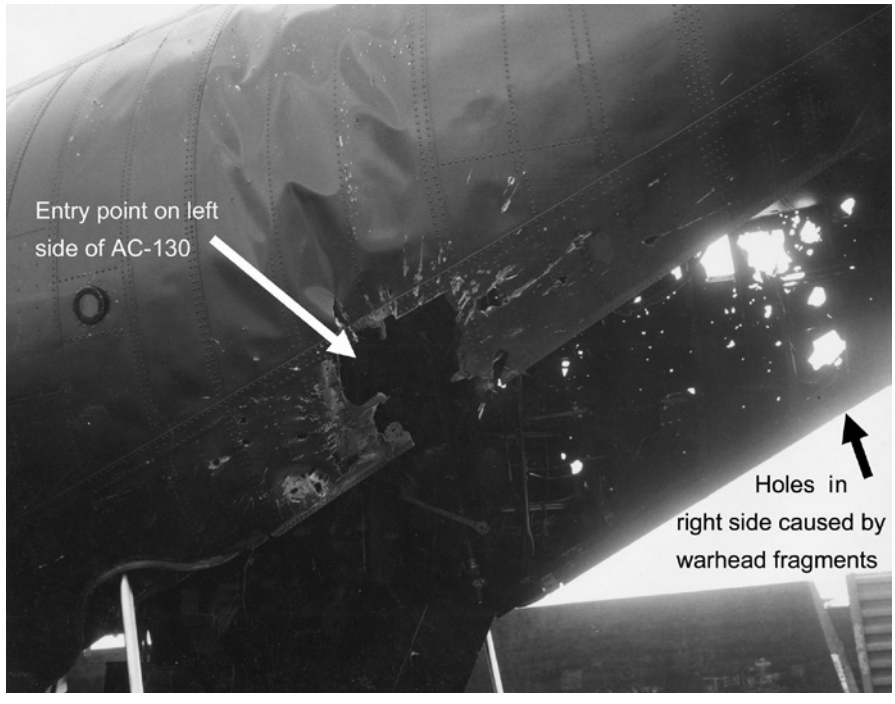
On April 24 and April 25, the C-130s went to night drops. On April 24 seven C-130s, escorted by AC-130 gunships, started to make night drops on An Loc. All made it in safely on the first night and dropped their loads, but few of the supplies were recovered because the DZ lights were masked by antiaircraft tracers, artillery flashes, and fires in the city. Additionally, almost every C-130 on the drops was hit by AAA.

On April 25, 11 C-130s tried another night mission, but the first few aircraft over the DZ faced heavy antiaircraft fire and one C-130 was shot down. The rest of the missions that night were called off and ten additional missions were canceled the following night due to inclement weather. For the next seven days Air Force C-130s made only night drops (37 missions), but over 50 percent of these C-130s were hit by enemy fire, and only about 30 percent of the supplies were recovered.

Antiaircraft fire continued to increase in volume and intensity and another C-130 with its crew was lost on May 3. At that point three C-130s had been lost and 38 had been hit by enemy fire over An Loc, and to compound the problem during this time the PAVN fired the first SA-7 at US aircraft in MR I. While there were no reports of SA-7s near An Loc, a low-flying C-130 was an easy target for a SA-7 so low-level resupply operations were terminated.

With increasingly desperate conditions on the ground in An Loc, on May 4 the C-130 crews tried dropping supplies from high altitude using "high velocity" 15ft slotted parachutes normally used to pull cargo ramps from the aircraft. These slotted extraction parachutes stabilized but did not retard the descent of the load, which descended at roughly 128ft/sec, approximately four times the normal descent. But the high-velocity 'chutes not only allowed the C-130 crews to drop from altitudes above the range of the antiaircraft guns but also permitted unprecedented accuracy and less susceptibility to winds. The supplies were loaded with extra honeycomb packing material and it was found that even ammunition bundles could be safely dropped using the high-velocity parachutes. Some supplies such as medical materials and fuel proved unsuitable for the high-velocity method and had to be dropped using normal parachutes.

Eleven high-velocity drop missions were made at An Loc from May 8 to 10 and out of 140 bundles dropped, 139 hit the DZ. Beginning May 29 the C-130s began to use a larger 22ft slotted parachute, which allowed medical supplies and fuel to be dropped.



The SA-7 was very effective against low, slow-flying aircraft and helicopters but had a small warhead and larger aircraft like this AC-130 could often absorb a hit, though SA-7s did occasionally bring down a C-130. (USAF)

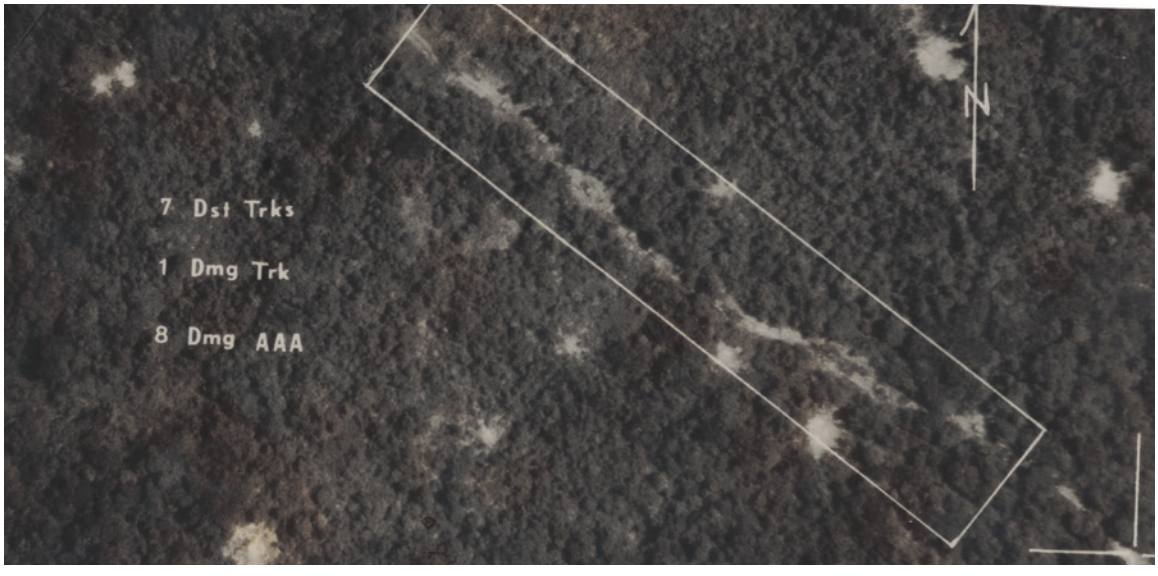
Strong communist forces remained around An Loc during June, but on June 8 the first ground reinforcements since April 16 reached the city. Helicopters brought in more fresh troops on June 13 and 14, a sign of how much the PAVN antiaircraft guns had been reduced, and by mid-June air drops into An Loc were cut to two per day. Both sides maintained defensive positions in the region and C-130s continued to resupply An Loc by air until December 1972.

The air war moves north

While the ground war raged in South Vietnam, a few days after the start of the invasion, the weather cleared in North Vietnam and the North Vietnamese supply lines were at last visible to US airpower, while enough reinforcements were in place to launch a new bombing campaign, called Operation *Freedom Train,* on April 5. This allowed American aircraft to attack any targets they could find south of 20 degrees North and US fighter pilots who had rarely seen an enemy vehicle in the open suddenly found large convoys of trucks on the open road in daylight, moving to supply the PAVN invasion forces. It was a fighter pilot's dream and they took advantage of it, hitting hard at the convoys while pounding the SAM sites and other air defenses that were protecting them.

Freedom Train also gave Nixon the opportunity to show the North Vietnamese (and his South Vietnamese allies) that this air war would truly be different, and in April 1972 there were five "special *Arc Light*" B-52 strikes deep into North Vietnam where B-52s had not gone before. They began on April 9 with Operation *Freedom Train Bravo* when 12 B-52Ds, supported by 15 Navy aircraft and 42 Air Force aircraft, made their farthest strike into North Vietnam, hitting the Vinh petroleum storage area and railroad yards in the central panhandle, using *Combat Skyspot* ground-directed radar for the bombing.

The strike was especially noteworthy because it marked a new stage in American countermeasures to the SA-2 missile, which was viewed as the main threat to American air strikes. Twenty F-4s led the B-52s in dropping 120 chaff bombs from 34,000 to 36,000ft to form a corridor 6–8 miles wide and 30–35 miles long for the B-52s to fly through (they



A post-strike photo of trucks destroyed on the road in April 1972. Few American fighter pilots had ever seen trucks on the road during the day until the invasion, and they took full advantage of the multitude of targets. (Author's collection)

had to stay in the chaff for it to be effective). The chaff bombs were modified M129E1 leaflet bombs with timed fuses and carried two types of chaff: QRC-530 to counter the SA-2 track-while-scan radar and RR-44 which provided broad band coverage. They were dropped by the 497th TFS (Tactical Fighter Squadron) from the 8th TFW at Ubon, which was to have this mission for the rest of the war. On this first mission, the chaff did not spread as planned because of winds.

While the strike may have "sent a message" to the North Vietnamese, from the US point of view this strike was not satisfactory. Rather than bombing with the B-52s' internal systems, the strike was controlled by *Combat Skyspot*, the ground-directed instrument bombing system that was the preferred method of bombing in South Vietnam, but this raid was too far from the *Combat Skyspot* radar sites. To everyone's chagrin, the damage was very limited, and post-strike reconnaissance showed that the bombing was "grossly inaccurate." The implications of the B-52s' poor bombing were significant and disturbing: B-52s could carry up to 108 500lb and 750lb bombs, and an inaccurate B-52 drop could kill large numbers of civilians – the last thing the United States could stand in such a controversial war. The US headquarters put strict limitations on future B-52 targets to prevent civilian casualties until "SAC can determine the cause of the … [poor performance of the] B-52 system."

On the night of April 12/13 18 B-52s carried out Operation *Freedom Dawn* and bombed another target in the center of the North Vietnamese panhandle, Thanh Hoa's air base of Bai Thuong, part of North Vietnam's expanded airfield complex. Once again there was a massive escort, but this time the B-52s used their own internal bombing systems and the bombing was very accurate. This relieved the US headquarters' anxiety about the B-52s' accuracy and more B-52 missions were scheduled using their own internal bombing radar, though the planners' awareness of the consequences of a gross error with up to 108 bombs never went away.

The air war escalated further early on the morning of April 16 with the first B-52 strikes in the Hanoi/Haiphong area, known to the United States as Route Package VI, with Operation *Freedom Porch Bravo.* Seventeen B-52s from U-Tapao struck the major fuel and oil storage area around the port city of Haiphong before dawn, using the same escort and chaff package as the previous B-52 raids. The North Vietnamese defensive reaction – MiGs, SAMs and AAA – was heavy, but only two US aircraft were lost (no B-52s), and the Air Force scored

Chaff, initially delivered by chaff bombs, and later supplemented by chaff dispensers, was one of the keys to the very low Air Force losses to ground defenses on *Linebacker* missions to the Hanoi area. No aircraft was shot down by a SAM while in the chaff corridor. (USAF)

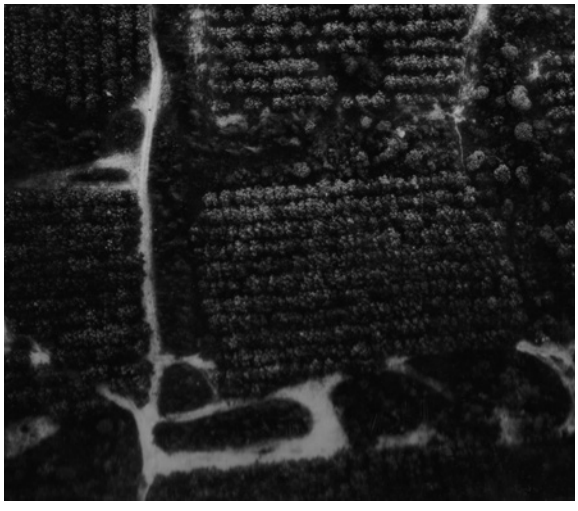
three MiG kills for no losses. The results were excellent – the pre-dawn B-52 strikes and Air Force F-4 attack later in the morning on a Hanoi tank farm destroyed about half the known petroleum, oil and lubricants (POL) storage in the area. Their first mission to Route Package VI in over four years had been an exciting one for US aircrews.

Despite the success, all was not well. Many of the F-4s' bombs missed the targets and the commander of Seventh Air Force, General John W. Vogt, like many Air Force generals enamored by the new generation of precision guided munitions (PGM), began to fixate on using them to the exclusion of "dumb bombs." Vogt was afraid of civilian casualties that might lead to putting important targets off-limits, and he made a decision that was to shape the Air Force bombing campaign over North Vietnam for the rest of *Linebacker* – the Air Force strikes would make maximum use of PGMs. Also, despite the three MiG kills, the mission made clear that the Air Force missile problems that had existed during *Rolling Thunder* had not been solved. Fifteen AIM-7s had been fired under ideal conditions, but only three hit. Additionally, all four of the AIM-9s fired had failed.

On the afternoon of April 19, the VNPAF struck back at the Navy when two MiG-17s from the 923rd Fighter Regiment carried out a daring daylight attack on ships in the Gulf of Tonkin. Le Xuan Di damaged the destroyer USS *Higbee* with a 500lb bomb and the two MiGs escaped unharmed.

On April 21 the B-52s returned on Operation *Freighter Captain*, when 18 B-52s hit warehouses near Thanh Hoa with their usual escort of chaff-dropping F-4s and F-105G Wild Weasels. The next B-52 raid was on April 23 – Operation *Freedom Winner* – when 18 B-52s returned to Thanh Hoa. For the first time over North Vietnam a B-52 was damaged in the wing by a surface-to-air missile, which blew off most of an external wing tank and forced it to shut down three of its eight engines. The damaged B-52 landed at Da Nang AFB in South Vietnam.

The April B-52 missions highlighted tension between Nixon, Secretary of Defense Melvin Laird, and the commander of US forces in Vietnam, General Creighton Abrams. Nixon wanted to use B-52s for regular strikes deep into North Vietnam, but Abrams and Laird wanted all B-52s to be used to attack the North Vietnamese invasion forces in South Vietnam



because, they argued, the war could be lost in the south before the North Vietnamese realized they were running out of supplies. The Laird/Abrams argument carried the day and there were no more B-52 strikes deep into North Vietnam until the end of the year.

ABOVE LEFT
On April 11 a sharp-eyed photo interpreter from the 432nd TRW at Udorn spotted some missile "cigars" in a forest just north of the DMZ. (Author's collection)

ABOVE RIGHT
The next day, 24 F-4s from the 432nd TRW attacked the "SAM woods" with unguided 500lb bombs and cluster bombs. Post-strike photos after the area was struck showed a large number of SA-2 shipping "cigars" lying on the ground, and the delicate missiles in the "cigars" rendered useless. (Author's collection)

Operation *Pocket Money*

Nixon's National Security Advisor Henry Kissinger visited Moscow from April 20 to April 24 to prepare for the May summit, and at the urging of the Soviets Kissinger then went to Paris for a secret meeting with North Vietnam's chief negotiator, Le Duc Tho, on May 2. However, the North Vietnamese had just captured Quang Tri and were not willing to listen to any peace proposals. "What the May 2 meeting revealed," Kissinger later commented, "was Hanoi's conviction that it was so close to victory that it no longer needed even the pretense of a negotiation." After Kissinger returned from Paris, he met with the President to decide upon a proper response to Hanoi's unwillingness to negotiate. Both men agreed that only a massive shock could deter the North Vietnamese from their goal of total victory and they agreed that all North Vietnamese harbors would be mined, along with an air campaign to shut down the enemy's overland supply routes.

Thus, on May 4 the CJCS, Admiral Thomas Moorer, was directed to draft the orders for the first act of Operation *Rolling Thunder Alpha*, quickly renamed *Linebacker*. Admiral Moorer told Nixon what mining Haiphong would entail (Moorer was a mining expert) and finally, after seven years of US military attempts to gain permission to mine North Vietnamese harbors, on May 6 President Nixon approved the operation.

For maximum dramatic effect, it was decided that President Nixon would announce the operation in a televised speech on May 8 at 9.00pm (US Eastern Standard Time) and say that as he spoke the mines were being dropped. This made the timing of the operation critical.

On the morning of May 9 (Vietnam time), Carrier Task Force (CTF) 77 was in position to carry out the mining mission. USS *Coral Sea* (CVA 43), the mining carrier, was operating 100 miles south-southeast of Haiphong with USS *Kitty Hawk* (CVA 63), whose planes were to fly supporting missions for the mining, about 20 miles southwest of the *Coral Sea*. To protect the carriers, the two guided missile cruisers *Chicago* and *Long Beach*, and the destroyers *Hammond*, *Evert F*, *Larson*, and *Sterrett,* were stationed 30–100 miles from Haiphong harbor between the port and the carrier.

The plan was to lay 36 Mk.55 Mod 2 acoustic/magnetic mines in the two main Haiphong ship channels precisely at 9.00am Vietnam time as the President spoke. Commander Roger Sheets, carrier air wing commander (CAG) of the *Coral Sea*, was to lead the mining force

Two shots of an Air Force AIM-7 kill on a non-maneuvering MiG-21. The missile corkscrews out with a huge white plume and hits the MiG in the rear quarter. The MiG, on fire, comes out of the blast in the second picture. The photo was taken from an F-4E; the F-4D did not have a gun camera. (Author's collection)

of three Marine A-6s from Marine All Weather Attack Squadron VMA (AW) 244, the "Bengals", and six Navy A-7Es from Navy Attack Squadrons VA 94 and VA 22. The mining force was accompanied by a single EKA-3B Skywarrior for electronic countermeasures support, with all aircraft from the *Coral Sea.*

Given the political importance of this mission and the results that the Navy expected it to achieve, Sheets, his bombardier/navigator Captain William D. "Charlie" Carr, and the air crews – highly experienced combat aviators, but none of whom had done actual mining – scrutinized every detail of the mission. The night before the mission, Sheets briefed the CTF 77 admirals and staff on the plan. The admirals decided to bring the guided missile cruiser *Chicago* close to the North Vietnamese coast to protect the strike force with its Talos antiaircraft missiles, and Sheets told them they could fire at anything above 500ft – the strike force would be well below that altitude.

Tragically, after the briefing Rear Admiral Rembrandt C. Robinson, commander of the cruiser and destroyers, and his staff were returning from the meeting to his flagship when their helicopter lost power as it was landing and rolled overboard from the flagship flight deck. Admiral Robinson drowned, the only Navy flag officer killed during the Vietnam War.

One limitation for the strike force was the size and weight of the Mk.55 mine. The 80×19in parachute-retarded mines would add 8,000lb of weight to the A-6 and not only slow its speed down to 375 knots but also prevent it from carrying an auxiliary fuel tank. This meant that the A-6s would be much more vulnerable to the defenses, and also that *Coral Sea* would have to come within 100 miles of the coast of North Vietnam to ensure that the aircraft would have enough fuel for a round trip.

To distract the North Vietnamese defenses, the carrier *Kitty Hawk* was to launch 19 strike aircraft to attack Nam Dinh railroad siding at the same time as the mining operation, and a surface group of destroyers was to shell antiaircraft positions on the Do Son peninsula, about 6 miles west of the Haiphong channel, for 30 minutes just before the strike.

At 8.10am on the clear morning of May 9, *Coral Sea* launched the mining strike force of three A-6As and six A-7Es. The strike circled the ship until 8.40am and then headed

Operation *Pocket Money*, the mining of Haiphong harbor, was led by three A-6As from Marine All-Weather Attack Squadron VMA (AW) 244, the Bengals, each carrying four Mk.55 mines (pictured), as well as six A-7Es with the same load. (William "Charlie" Carr)

toward Haiphong, flying in trail at 100ft and 375 knots with the three A-6s in the lead. At 8.45am the diversionary strike from *Kitty Hawk* found bad weather at the primary target and struck coastal targets at Thanh Hoa and Phu Qu, while the destroyer group began firing on antiaircraft positions on the Do Son peninsula just west of the Haiphong channel.

For the attack, the three A-6s were each to drop four mines in the innermost western channel, a total of 12 mines, and the six A-7s were each to drop their four mines in the outer channel, a total of 24 mines. As the force approached the drop area the groups split up. The A-6s headed directly to the inner channel, which was only 1,000ft wide, for a tight formation delivery while the A-7s split off to the right, then turned back to the left, and fanned out to the left again to deliver their mines perpendicular to the outer channel. To deliver the mines all the aircraft had to climb to 500ft, timing the first mine drop at 9.00am.

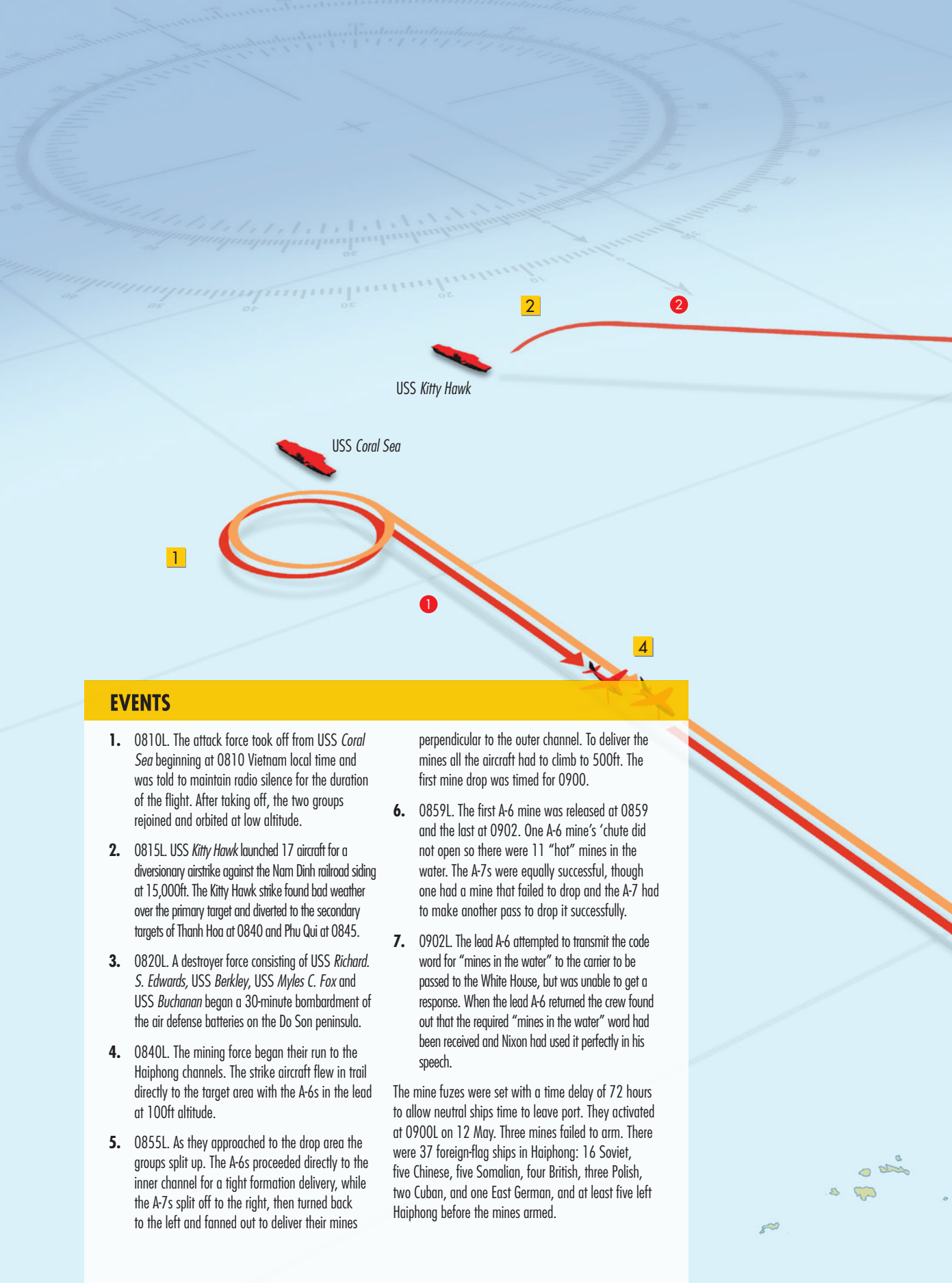
Charlie Carr, the bombardier/navigator in the lead plane, noted how accurately the charts reflected the actual conditions: "Even the fish weirs were in the right places." Others in the group noted the general lack of opposition to the flight and the quiet over the target.

The three A-6s flew parallel to the axis of the 1,000ft-wide main channel and released the mines at the predetermined point. The first mine fell free of Carr and Sheet's A-6 at 8.59am and all of the 12 mines were laid in positions that prevented any shipping using the channel.

By 9.01am, the A-6s had placed 12 mines in the inner channel and the A-7s had dropped their 24 in the outer channel. One A-7 failed to drop on the initial pass, so the pilot came around and dropped his mines on a reverse pass. Of these 36 mines, three failed to arm. Surprisingly, there was little defensive reaction from the North Vietnamese.

As soon as all the mines were laid, Carr radioed *Coral Sea* to inform of the successful drop, but to his dismay he did not receive a response. However, as he learned when he returned, in fact the *Coral Sea* did receive the message and sent off a flash cable to the White House, announcing that the mines were in the water. Nixon had already begun his speech but had been speaking slowly to allow the A-6s to leave the target area safely, and upon receiving the message he announced:

> I have ordered the following measures, which are being implemented as I am speaking to you. All entrances to North Vietnamese ports will be mined to prevent access to these



EVENTS

1. 0810L. The attack force took off from USS *Coral Sea* beginning at 0810 Vietnam local time and was told to maintain radio silence for the duration of the flight. After taking off, the two groups rejoined and orbited at low altitude.

2. 0815L. USS *Kitty Hawk* launched 17 aircraft for a diversionary airstrike against the Nam Dinh railroad siding at 15,000ft. The Kitty Hawk strike found bad weather over the primary target and diverted to the secondary targets of Thanh Hoa at 0840 and Phu Qui at 0845.

3. 0820L. A destroyer force consisting of USS *Richard. S. Edwards,* USS *Berkley*, USS *Myles C. Fox* and USS *Buchanan* began a 30-minute bombardment of the air defense batteries on the Do Son peninsula.

4. 0840L. The mining force began their run to the Haiphong channels. The strike aircraft flew in trail directly to the target area with the A-6s in the lead at 100ft altitude.

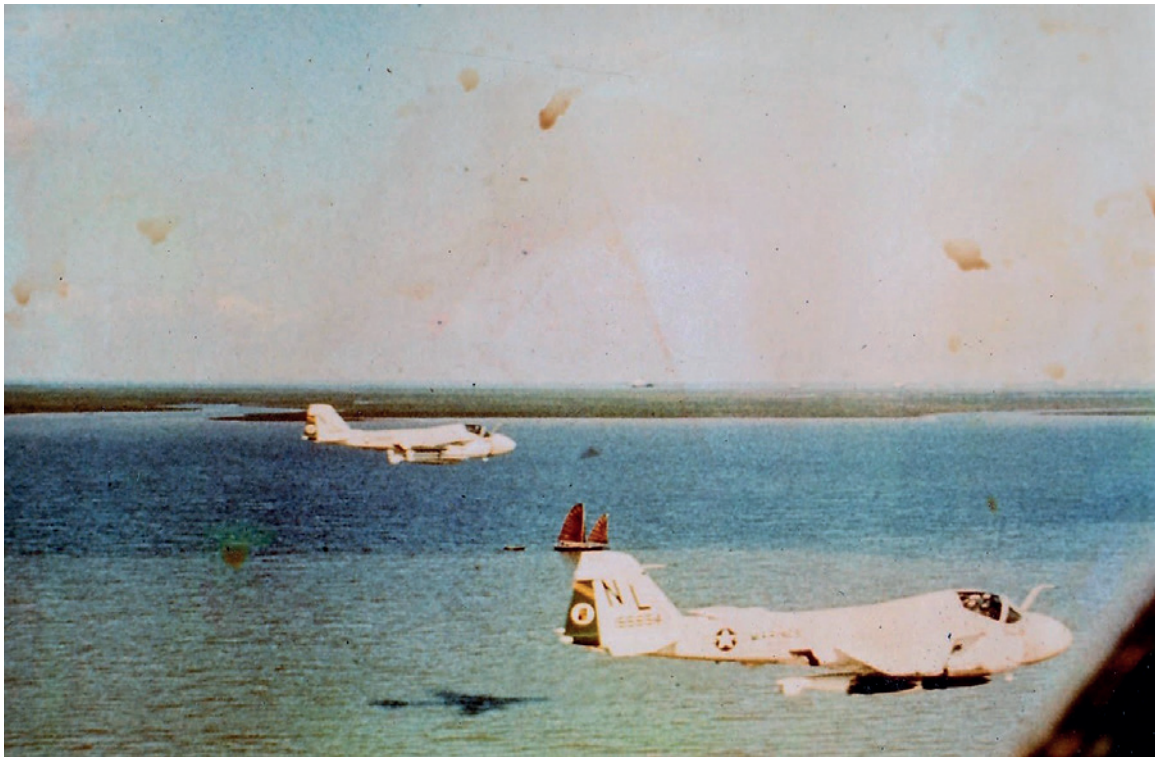
5. 0855L. As they approached to the drop area the groups split up. The A-6s proceeded directly to the inner channel for a tight formation delivery, while the A-7s split off to the right, then turned back to the left and fanned out to deliver their mines perpendicular to the outer channel. To deliver the mines all the aircraft had to climb to 500ft. The first mine drop was timed for 0900.

6. 0859L. The first A-6 mine was released at 0859 and the last at 0902. One A-6 mine's 'chute did not open so there were 11 "hot" mines in the water. The A-7s were equally successful, though one had a mine that failed to drop and the A-7 had to make another pass to drop it successfully.

7. 0902L. The lead A-6 attempted to transmit the code word for "mines in the water" to the carrier to be passed to the White House, but was unable to get a response. When the lead A-6 returned the crew found out that the required "mines in the water" word had been received and Nixon had used it perfectly in his speech.

The mine fuzes were set with a time delay of 72 hours to allow neutral ships time to leave port. They activated at 0900L on 12 May. Three mines failed to arm. There were 37 foreign-flag ships in Haiphong: 16 Soviet, five Chinese, five Somalian, four British, three Polish, two Cuban, and one East German, and at least five left Haiphong before the mines armed.

Operation *Pocket Money*
Haiphong, May 9, 1972
Thanh Hoa
Nam Dinh
NORTH VIETNAM
GULF OF TONKIN
US NAVY UNITS
1. Mining force from USS Coral Sea:
Three Marine A-6 Intruders from VMA (AW) 244
Six US Navy A-7E Corsair IIs from VA 94 and VA 22
One EKA-3B Skywarrior
2. Diversionary airstrike from USS Kitty Hawk:
Five A-6 Intruders
Eight A-7 Corsair IIs
Four F-4 Phantom II
Destroyer force
Do Son
Haiphong
3
5
6
7



The *Pocket Money* attack force penetrated at very low altitude, less than 200ft, and the raid leader, Navy Commander Roger Sheets, told the US Navy missile frigates that were protecting the raid that they were cleared to shoot at anything above 500ft, because "we won't be that high." (William "Charlie" Carr)

ports and North Vietnamese naval operations from these ports. United States forces have been directed to take appropriate measures within the international and claimed territorial waters of North Vietnam to interdict the delivery of supplies. Rail and all communications will be cut off to the maximum extent possible. Air and naval strikes against North Vietnam will continue.

Almost unnoticed, overshadowed by the drama of the mining mission, he announced a major change in the US objectives for the war, saying that the US would accept a ceasefire and would withdraw its forces from South Vietnam without North Vietnam doing the same. For years the US had demanded a complete withdrawal of North Vietnamese troops from South Vietnam, but Nixon now reduced its objectives for a peace agreement to two:

- All POWs returned.
- An internationally supervised ceasefire throughout Indochina.

Once those terms had been met, the US would cease bombing and complete a withdrawal from Vietnam within six months.

Nixon hoped the announcement would resuscitate the Paris peace talks, but for the next four months the North Vietnamese appeared to ignore this change in the US negotiating position.

Three days later the mines were activated, and the harbors were effectively closed for the duration of the war. This showed that *Linebacker* would be in many practical ways unrestrained, and expectations were high that *Linebacker* operations would seriously cut the flow of supplies into North Vietnam.

The concept of *Linebacker*

Linebacker was to be a systematic air campaign designed to dismantle the North Vietnamese transportation system. The original list of *Linebacker* targets was intended to isolate Hanoi

and Haiphong by neutralizing their defenses, destroying the rail and road links to the north and south, and then eliminating all war materiel in storage or in transit.

The North Vietnamese relied upon two major supply routes for their imports. Soviet and neutral ships offloaded at Haiphong harbor, where goods were transported via rail to storage facilities near Hanoi and Haiphong. Chinese supplies arrived via a 50-mile rail line connecting southeastern China and Hanoi and a northwest railway from southwest China.

The Haiphong, northeast, and northwest railways converged north of Hanoi, where a single rail line crossed the Red River over the Paul Doumer bridge. This huge bridge was over a mile long and handled both rail and road traffic, and, as a critical choke point, it had been repeatedly attacked during the *Rolling Thunder* air campaign. Following the 1968 bombing pause, the North Vietnamese repaired and fortified the bridge against future air strikes.

After passing through Hanoi, trains traveled south through the city of Thanh Hoa, where the Thanh Hoa bridge, known to the Vietnamese as *Ham Rong*, "Dragon's Jaw," provided a second major choke point. From Thanh Hoa, trains headed south down the North Vietnamese panhandle to the city of Vinh. From here, supplies were moved via truck or boat, or packed on foot, across the DMZ or westward into Laos along the Ho Chi Minh Trail.

In addition to the rail network, the North Vietnamese road system roughly paralleled the railways and, at key choke points, utilized the same bridges.

To move fuel, the North Vietnamese had constructed a series of small pipelines to transport supplies from China to North Vietnam and further south to the base areas of Laos, Cambodia, and South Vietnam. These pipelines made the fuel supply network more resilient in the face of US air attacks.

In concept, the overall aim of *Linebacker* was the same as *Rolling Thunder* – interdiction of the North Vietnamese supply lines – but in execution it was very different. *Linebacker*'s standing operations order was to disrupt transportation from the DMZ to the Chinese buffer zone (30 nautical miles wide to 106 degrees East longitude, then 25 miles from the 106-degree line to the Gulf of Tonkin) but, unlike *Rolling Thunder*, all the North Vietnamese air defenses – SAM sites, most airfields, GCI radars – were included in the targeting plan.

Even with some restraints, *Linebacker* felt very different to the combat aircrews. Approval for new targets was quickly granted, and as the operation continued many of the Rules of Engagement (ROE) were gradually or temporarily relaxed. The military was quite pleased

Operation *Pocket Money*

On May 6, 1972 President Nixon approved the mining of Haiphong harbor and decided to announce the operation in a televised speech on May 8 at 9.00pm Washington time. Thirty-six Mk.55 Mod 2 acoustic/magnetic mines would be laid in the two main Haiphong ship channels at 9.00am Vietnam time precisely, just as the President spoke. Commander Roger "Blinky" Sheets, CAG of the carrier USS *Coral Sea,* would lead a mining force of three Marine A-6s from Marine All Weather Attack Squadron VMA (AW) 244, the Bengals, and six Navy A-7Es from Navy Attack Squadrons VA 94 and VA 22.

The 80×19in parachute-retarded mines added 8,000lb of weight and would limit the A-6s to 375 knots, as well as prevent the A-6s from carrying an auxiliary fuel tank, so the *Coral Sea* had to come within 100 miles of the North Vietnamese coast to ensure that the A-6s would have enough fuel. The morning of May 9, *Coral Sea* launched the mining strike force and the strike headed toward Haiphong at 100ft and 375 knots, with the three A-6s in the lead.

The three A-6s were each to drop four mines in the innermost western channel and the six A-7s were each to drop their four mines in the outer channel. The A-6s headed directly to the inner channel, which was only 1,000ft wide, for a tight formation delivery, while the A-7s turned away to the right, then back to the left, and fanned out to the left again to drop their mines perpendicular to the channel.

The first mine was dropped at 8.59am Vietnam time and all the mines dropped by 9.01am as Nixon delivered his speech.

rwith the ROE for *Linebacker*; the Seventh Air Force commander summed up their feelings when he said: "We were not constrained. We were allowed to take out all power [major electric power plants] in a very short time, with the exception of one power plant and that was the thermal power plant for Hanoi itself."

Linebacker: the first day, May 10

Following the mining operation, the Navy and Air Force launched massive attacks on Haiphong and Hanoi on May 10; these were to be a microcosm of the way the Air Force and Navy approached the rest of *Linebacker*. The Air Force sent in a single large force of mostly support aircraft for a two-pronged strike to Hanoi, one prong using PGMs on point targets and another with unguided 500lb bombs. The Navy sent in three large Alpha strikes launched about four hours apart with few support aircraft, to the area around the port city of Haiphong and to more general targets on the coast.

The day began with Navy Alpha strikes on targets in Haiphong from its three carriers on Yankee Station, the USS *Constellation*, USS *Kitty Hawk*, and USS *Coral Sea.* The *Constellation* launched its strike force consisting of 16 strike aircraft and 15 support aircraft at 8.00am against targets in Haiphong, followed by strikes from the *Kitty Hawk* at 8.10am on the Haiphong Hai Dung main railroad yard and the *Coral Sea* at 8.20am on Haiphong's Lai Vu and Phu Luong highway bridges.

As the *Constellation*'s strike was inbound, it received a call from *Red Crown*, the GCI controller, that MiGs were taking off from Kep airfield. Two escorting F-4Js went west to intercept the MiGs and Lieutenant Curt Dose shot down one MiG-21 from the 921st Fighter Regiment flown by Nguyen Van Ngai. All the Navy aircraft returned to their carriers safely and began preparations for their next strike later that day.

At about 9.00am on May 10, the Air Force launched its first strike of *Linebacker*, a single strike of 16 Ubon F-4Ds with PGMs against the Paul Doumer bridge in Hanoi along with 16 F-4s with "dumb" bombs against the Yen Vien railroad yard just northeast of the city. The strike had a massive support force of 20 fighter escorts, eight chaff bombers, 15 F-105G Wild Weasels, and four EB-66 ECM/jamming aircraft, as well as 20 KC-135 tankers for pre- and post-strike refueling.

The first USAF aircraft into North Vietnam were four *Combat Tree* F-4Ds flying MiGCAP (combat air patrols directed specifically against MiGs) from the 432rd TRW. They were led by Major Bob Lodge, a USAF Fighter Weapon School graduate who already had two MiGs to his credit and was expected to be the first Air Force ace. Lodge and his flight were patrolling at low altitude when they picked up four MiG-21s from the 921st Fighter Regiment on their *Tree* equipment. The F-4s were below the MiGs and seemingly undetected, in what looked like a perfect attack set-up as they turned toward the MiGs, knowing that since they were the only US fighters in the area they could fire their AIM-7s head-on without visually identifying the MiGs.

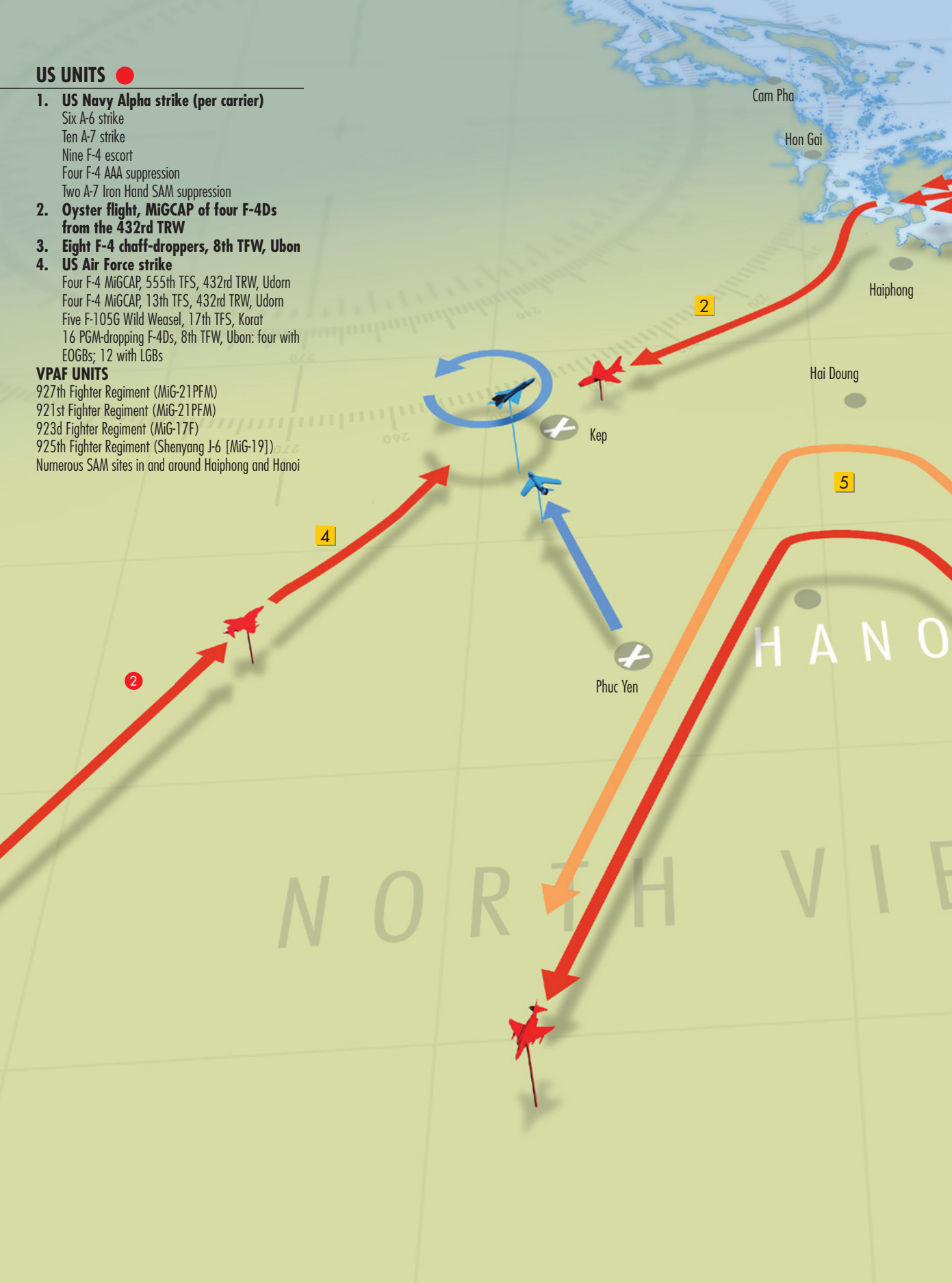
Lodge fired at the second MiG in the flight with an AIM-7 and his wingman fired two AIM-7s at almost the same time, while the other two members of the flight turned away from Lodge to attack another MiG. Lodge's missile hit a MiG flown by Cao Son Khao, while the first MiG flashed by and Lodge turned to pursue him.

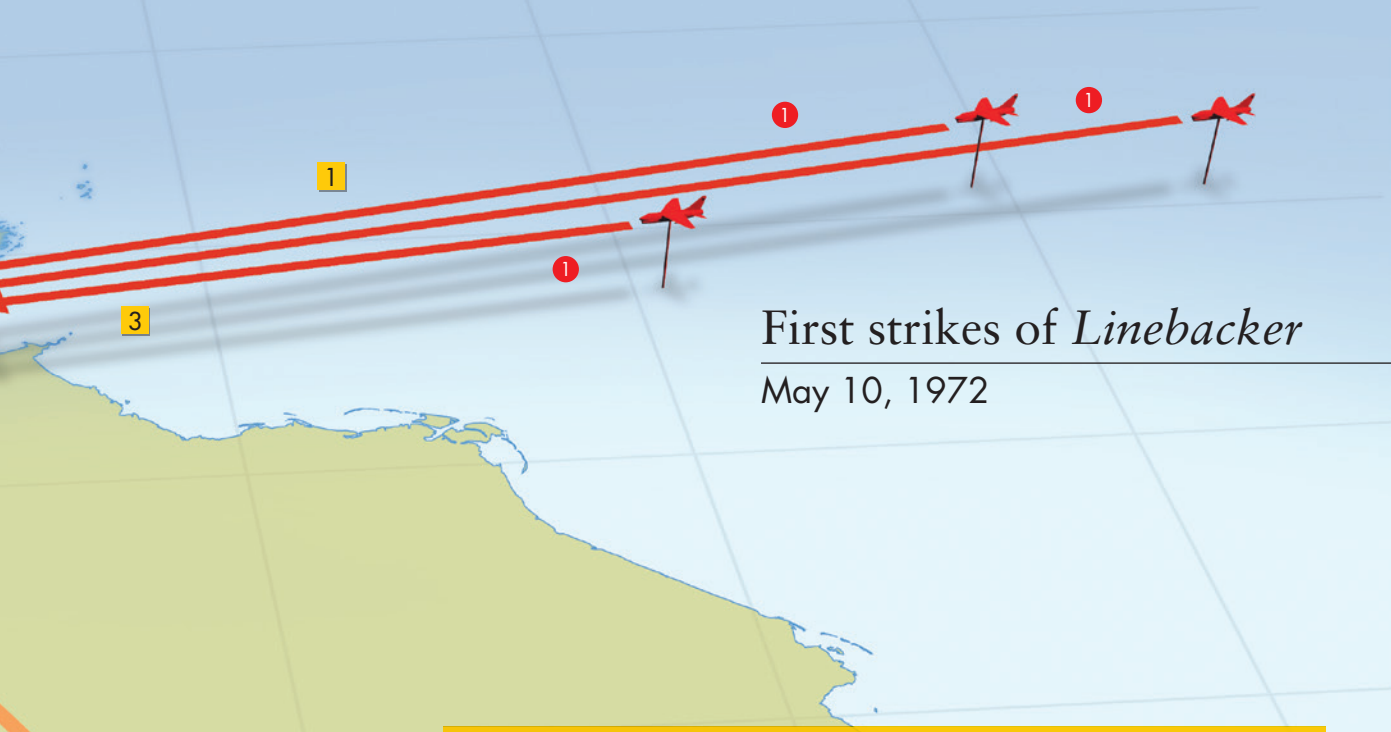
However, the North Vietnamese had developed a set of new tactics that had one flight come in high and another flight well below them; these new tactics, plus all the mistakes of Air Force air-to-air philosophy and training, came into play. Because the Air Force emphasized the use of the AIM-7 radar-guided missile, which had to be followed until it hit, Lodge's wingman had to track his AIM-7s and had been pulled too far away to support him when four MiG-19s from Yen Bai's 925th Fighter Regiment appeared behind Lodge's F-4. The flight lead, Pham Ngoc Tam, was on his first combat mission and overshot Lodge's F-4, moving slightly in front of and close off the left wing where he should have been easily seen.

The lead pilot for *Pocket Money*, shown here on the left side of the picture was Navy Commander Roger "Blinky" Sheets, carrier air wing commander (CAG) of the carrier USS *Coral Sea*, and on Sheet's left is the man responsible for the vital timing and navigation, his bombardier/navigator Marine Captain William D. "Charlie" Carr. (William "Charlie" Carr)

However, Lodge's WSO (Weapon Systems Officer) was not looking behind him and both Lodge and the back-seater ignored calls from Lodge's wingman saying, "Lead, break right, break right, they're firing." Pham Ngoc Tam pulled back behind Lodge's F-4 and opened fire from close range with his 30mm cannon, and the F-4 went into a flat spin. The back-seater ejected but Lodge was killed in the crash.

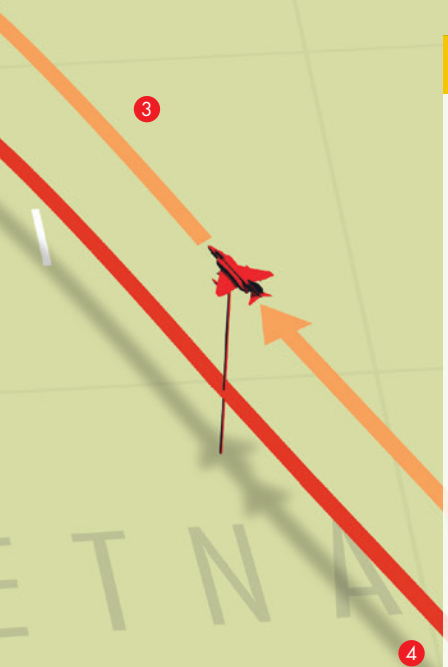
A few minutes later four F-4s escorting an LGB flight were attacked by a MiG-19 and were introduced to the maneuverability of the new fighter. The four F-4s saw the MiG-19 crossing behind them perpendicular to their flight path at very high speed and the flight leader said to himself, "There is no way he can make that turn … I just knew he couldn't make the


US UNITS
1. US Navy Alpha strike (per carrier)
Six A-6 strike
Ten A-7 strike
Nine F-4 escort
Four F-4 AAA suppression
Two A-7 Iron Hand SAM suppression
2. Oyster flight, MiGCAP of four F-4Ds from the 432rd TRW
3. Eight F-4 chaff-droppers, 8th TFW, Ubon
4. US Air Force strike
Four F-4 MiGCAP, 555th TFS, 432rd TRW, Udorn
Four F-4 MiGCAP, 13th TFS, 432rd TRW, Udorn
Five F-105G Wild Weasel, 17th TFS, Korat
16 PGM-dropping F-4Ds, 8th TFW, Ubon: four with EOGBs; 12 with LGBs
VPAF UNITS
927th Fighter Regiment (MiG-21PFM)
921st Fighter Regiment (MiG-21PFM)
923d Fighter Regiment (MiG-17F)
925th Fighter Regiment (Shenyang J-6 [MiG-19])
Numerous SAM sites in and around Haiphong and Hanoi
Cam Pha
Hon Gai
Haiphong
Hai Doung
Kep
Phuc Yen
HANO
NORTH VIE
2
4
5
2



First strikes of *Linebacker*

May 10, 1972



EVENTS

On May 10 both the Air Force and Navy launched full-scale attacks on Hanoi and Haiphong. The day was a microcosm of the way each approached *Linebacker*. The Air Force sent in a single two-pronged attack with a large force of mostly support aircraft to Hanoi, with one prong dropping PGMs on point targets and another using unguided weapons. The Navy sent in three large Alpha strikes after more general targets on the coast, launched about four hours apart with few support aircraft.

1. Beginning at 0800, the Navy launched Alpha strikes ten minutes apart from three carriers, USS *Constellation*, USS *Kitty Hawk*, and USS *Coral Sea*, against a variety of installations in Haiphong.

2. While covering the strikes, at 0835 two F-4Js from Constellation were sent north by *Red Crown* GCI to engage MiG-21s over Kep airfield. Lt Curt Dose shoots down one MiG-21 on takeoff.

3. 0840. The *Constellation* Alpha strike attacked Haiphong targets, while *Coral Sea's* attacked Haiphong's Lai Vu and Phu Luong highway bridges and *Kitty Hawk's* hit Haiphong's Hai Dung main railroad yard.

4. 0920. Two USAF MiGCAP flights from the 432rd TRW enter North Vietnam at 15,000ft prior to the arrival of the strike force. Both flights are equipped with *Combat Tree* to detect MiG transponders. Oyster flight is led by Major Bob Lodge, the Air Force's leading MiG killer. At 0945 Oyster flight engages MiG-21s over Kep airfield. Lodge shoots down one, but MiG-19s from Phuc Yen then shoot Lodge down and he is killed. Final total: three MiG-21s and one F-4 shot down.

5. At 0945 Wild Weasels arrive leading the main strike flight. F-4 chaffers fly in from the south of Hanoi at 23,000ft and lay 18-mile chaff corridor that runs straight north to the target, the Paul Doumer bridge. At 0954 four four-ship F-4D flights carrying PGMs come in from southwest at 13,000ft and turn north to enter chaff corridor. There are two miles between each flight. Goatee flight delivered its EOGBs lined up over the Doumer bridge on a northeast/southwest run, but all missed. Napkin, Biloxi, and Jingle flights attacked diagonally with LGBs and came close, but the bridge was left standing.

Later that day:

At **1005** 24 USAF F-4s (16 F-4s each carrying 12 Mk 82 500lb unguided bombs, and eight F-4 escorts) flew in from the north and attacked and heavily damaged Hanoi's Yien Vien rail yard. On egress one F-4 was shot down by a MiG-19 over Yen Bai.

1219 USS *Constellation* launched an Alpha strike on Hai Doung rail yard, followed by a *Kitty Hawk* Alpha strike at 1230 and a *Coral Sea* Alpha strike on the same target.

1300–c. 1320 Numerous MiG-17s from the 923rd FR at Kep engage the *Constellation* strike force over Hai Doung. In the melee six MiG-17s are downed. The F-4J crew of Lt Randy Cunningham and Lt (j.g.) Willie Driscoll shoot down thee MiGs and become America's first aces before they are downed and recovered.

At **1545** USS *Constellation* launched a final Alpha strike on the port at Hon Gai, followed ten minutes later by a *Coral Sea* Alpha strike on the railroad/highway bridge of Cam Pha, 12 miles east of Hon Gai, and at **1600** USS *Kitty Hawk* launched its final Alpha strike on Cam Pha and the surrounding road network.

turn, but he cranked in the bank, pulled it around, made a square corner and stopped" very close behind the last F-4 in the flight. The MiG-19, flown by Le Van Tuong, began to fire and the F-4 went down in flames.

At 9.45am four F-105G Wild Weasels arrived, and eight F-4 chaffers flew in from the south of Hanoi to lay an 18-mile chaff corridor south–north that ran straight to the target, the Paul Doumer bridge. At 9.54am four four-ship F-4D flights from Ubon carrying precision-guided munitions (PGM) came in from the southwest and turned north to enter the chaff corridor from the south. The first flight carried GBU-8 electro-optically guided bombs (EOGB) and the next three flights had laser guided bombs (LGB) and *Pave Knife* guidance pods. The first flight used GBU-8s but all missed, then three LGB flights dropped their bombs. While some of the LGBs hit and others came close, the bridge was left standing.

A few minutes later the second prong of the Air Force strike, 16 F-4s each carrying 12 Mk.82 500lb unguided bombs, came in from the north and attacked and heavily damaged the Yien Vien railyard just north of Hanoi. As they departed one F-4 was shot down by a MiG-19 over Yen Bai and this kill gave the 925th Fighter Regiment, whose pilots were flying their first combat missions, three F-4 kills for the day without a loss.

Shortly after noon, the three Navy carriers launched a second set of Alpha strikes against the Hai Doung railyard between Hanoi and Haiphong. The *Constellation* launched at 12.19pm, followed by the *Kitty Hawk* Alpha strike at 12.30pm and a *Coral Sea* Alpha strike at 12.40pm.

At 1.00pm, when the *Constellation* strike force arrived over Hai Doung, a large number of MiG-17s from the 923rd Fighter Regiment at Kep engaged and met with two unpleasant surprises: *Top Gun*-trained F-4 crews using an improved AIM-9, the AIM-9D, and Navy communications jamming operating from close offshore. As the battle began, the Navy specialists jammed the MiGs' communications with their GCI, but despite their loss of communications, the MiGs stayed to fight. It was a mistake.

The well-trained Navy F-4 crews had a field day against the MiGs, in the melee shooting down six MiG-17s. Lieutenant Randy "Duke" Cunningham and Lieutenant (jg) William "Willy" Driscoll shot down three MiGs and became America's first Vietnam ace crew before they were downed and later rescued, and one more Navy aircraft was downed by ground defenses. It was a stunning success for the Navy's post-1968 *Top Gun* training program.

But the Navy was not finished. Beginning at 3.45pm, they launched three more Alpha strikes, though in less well defended areas. USS *Constellation*'s Alpha strike hit the port at Hon Gai, the *Coral Sea*'s Alpha strike struck the bridge at Cam Pha, 12 miles east of Hon Gai, and the *Kitty Hawk* Alpha strike also hit Cam Pha and then conducted a road reconnaissance for moving targets.

At the end of the first day of *Linebacker*, six US aircraft had been lost, two to MiGs. US fighters had shot down at least nine MiGs for their biggest day of the war, but the day had not been a good one for the Air Force. Despite their *Tree* equipment, they had shot down only three MiGs for the loss of two F-4s. The loss of Bob Lodge had been especially disturbing; he had been the wing weapons officer at Udorn and was generally acknowledged as the "guru" of the 432nd's tactics as well as the most knowledgeable pilot in the wing about the *Combat Tree* system.

During *Linebacker*, the US Air Force and US Navy used entirely different methods for attacking targets in the Hanoi/Haiphong area, aka Route Package VI.

Air Force *Linebacker* missions

General Vogt's decision that the Air Force would use PGMs almost exclusively had enormous consequences. To keep the pressure on, one Air Force *Linebacker* strike was planned to the Hanoi area every day and flown if the weather permitted, but to deliver laser-guided bombs in defended areas, the Air Force had to use the basically handmade *Pave Knife* laser guidance pods, and it had only six of them in the theater and only a few

The Navy conducted three Alpha strikes on May 10, the first day of *Linebacker*. This is a famous picture from the rearward-looking strike camera of an VA-195 A-7E flown by Navy Lieutenant Mike Ruth bombing the Hai Duong bridge on the second Alpha strike. (US Naval Institute)

more in reserve. To protect these pods against the heavy defenses in the Hanoi area required an enormous support package, and this meant that the Air Force could only conduct one mission a day into Route Package VI and that it would be dropping relatively few bombs, albeit very accurately. As an example, during the *Rolling Thunder* campaign in June 1967 the Air Force flew 1,564 strike sorties into Route Package VI, while during the *Linebacker* raids of June 1972 it flew 278.

Unit specialization

The first consequence of the large Air Force missions was a logical one. The influx of new weapons and equipment such as the GBU-8, laser-guided bomb, chaff, Wild Weasel, and *Combat Tree* forced Seventh Air Force to acknowledge *de jure* what had already taken place *de facto*, that the most efficient way to operate was wing specialization, so it gave each of the wings in Thailand a primary specialty. The 433rd TFS and the 435th TFS of the 8th TFW at Ubon had been associated with the PGM programs from the beginning, so the wing was given the primary PGM strike role. The chaff-dropping F-4s, which had to work closely with

After shooting down three MiG-17s in one fight and becoming the Vietnam War's first American aces, Lieutenant Randy Cunningham (left) and Lieutenant (jg) Willie Driscoll (right) were brought down by North Vietnamese defenses but quickly recovered and returned to their carrier. (US Navy)

the PGM bombers, were also from Ubon, mainly from the 497th TFS. The 432nd TRW at Udorn – the closest wing to Hanoi and now equipped with the *Combat Tree* F-4Ds – was given the primary mission of air-to-air. The 388th TFW at Korat, with its F-105G Wild Weasels and EB-66 EC M aircraft along with F-4Es, was given the anti-SAM role. Later the F-4Es and the F-105Gs would pair as a hunter-killer team.

Smart bombs

As already mentioned, the most profound change in *Linebacker* was the use of PGMs, or "smart bombs," that were accurate down to a few feet, and their use in combat was the beginning of an air power revolution. Prior to PGMs, dropping "dumb" bombs was an art that few could master, requiring that the pilot be at a precise dive angle and air speed and drop at a precise altitude above the target – well within the range of most antiaircraft guns – to have a chance to score a hit. Such precision was virtually impossible in a combat environment, and adding to the difficulties was flak bursting around the aircraft and unpredictable winds. An internal Air Force study after *Rolling Thunder* showed that the best that could be expected was that bombs dropped in a high-threat area would hit within 1,000ft of the target, and that a direct hit on a target was simply a matter of luck. The result was that any small "point" target, such as a bridge, had to have hundreds of sorties against it (with concomitant heavy losses) and even then the target could not expect to be destroyed. It also meant that small targets in populated areas were not attacked for the (justified) fear of civilian casualties.

PGMs changed all that. From the beginning of the 1972 strikes into North Vietnam, the PGMs were the most important Air Force weapon in the campaign. Even with inexperienced pilots, the Air Force could now expect to take out any small target with just a few sorties. PGMs could also be dropped from a much higher, safer altitude, well above most antiaircraft gunfire. In addition, they made a whole new set of targets available. During *Rolling Thunder* many of the restrictions on bombing certain targets were because they were small and in populated areas, and there was a great fear of civilian casualties. The PGMs completely changed the US approach to bombing this type of target. PGMs proved to be so accurate that soon PGM strikes were permitted against small "point" targets that were surrounded by heavily populated areas.

SA-2 missile sites were rarely primary targets but were hit by Wild Weasel/ F-4E hunter-killer teams after the strike flight had hit and left the area. (Author's collection)

The Air Force had two PGMs available for *Linebacker*, the TV-guided GBU-8 Homing Bomb System (HOBOS) and the Paveway I laser-guided bomb. Both were unpowered and had to be dropped from a conventional dive-bomb pass, which was at first thought to be a disadvantage but proved unimportant. The two bombs were sent to the 8th TFW at Ubon RTAFB for combat tests in mid-1968, the 433rd TFS "Stan's Angels" working with the laser-guided bombs and the 435th TFS with the GBU-8s. By the time of *Linebacker* the two squadrons were very experienced in their tactics, operation, and delivery.

The GBU-8 consisted of a guidance kit in the nose fitted to a Mk.84 2,000lb bomb. The nose section had an electro-optical (EO) seeker – basically a black and white television – linked by four long slender fins and an umbilical conduit to link the tailfin control and communication electronics and nose sections. The GBU-8 had the advantage of being a "drop and forget" weapon where the F-4 back-seater would lock the GBU-8's camera onto a target then drop the bomb, and the bomb would guide to the target so the F-4 could take evasive action immediately after the bomb was dropped.

That is, when it worked. Unfortunately, the television camera that located the target was capable only of locking on to a point where there was a very sharp dark/light contrast, so the GBU-8 required a target with a very high contrast aiming point. Because of the weather over North Vietnam and the nature of the targets, few of the targets had such contrast.

A generally more useful system was the Paveway I LGB. Guidance was provided by systems in the modified nose section of a normal "iron" bomb – usually a Mk.84 2,000lb general-purpose bomb – with extra-large rear fins for stability to prevent rolling. The laser guidance section consisted of a small gimbal-mounted laser seeker head in the very nose that tracked the laser spot, plus a set of moveable canard fins to guide the bomb. The seeker pointed at the laser spot created by the designator, and as the laser light beam hit the target it reflected off, creating a large cone-shaped "basket" of reflected laser energy in the sky. The seeker stayed pointed at the spot and as it tracked the spot it sent commands to the guidance and control canard fins to adjust the flight path to the target.

A *Pave Knife*-carrying F-4D on the tanker. (Mike Pomphrey)

The LGB was spectacularly accurate. In early combat tests in Laos, over 50 percent of the bombs scored a direct hit on the target, and the average circular error for all bombs was 8ft. The Air Force also used a 3,000lb Mk.118, known as "Fat Albert," with a laser kit. "Fat Albert" was thin-cased and did not penetrate well but it made an even more impressive hole than the Mk.84.

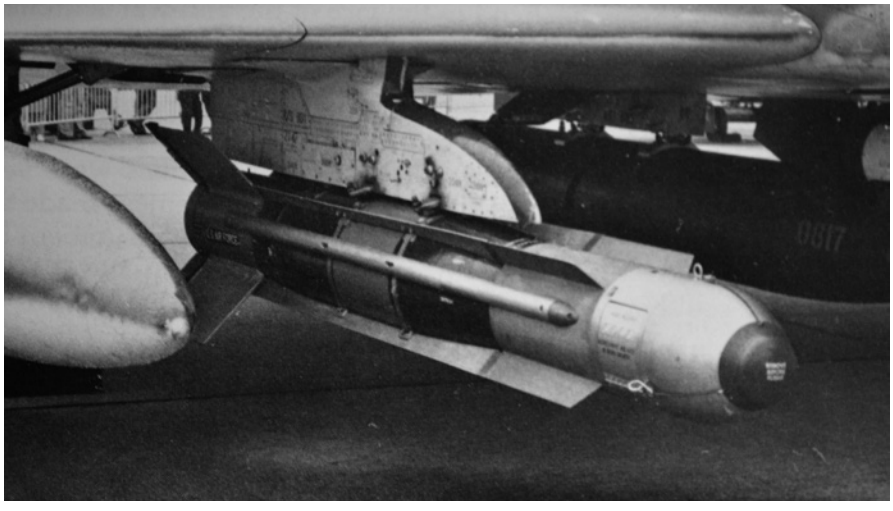
As one Air Force report put it:

> The Mark 84 Pave Way had been designed for a 40-foot [miss distance] and most people would have been more than happy with any figure less than that. Yet from the beginning of operational use of the production model… [the miss distances] diminished to zero.

Besides the accuracy, the tactical advantages were enormous. The "basket" of reflected energy where the bomb had to be dropped was very large, 1 mile in diameter for a bomb dropped from 11,000ft, and virtually any pilot could put a bomb in it – and the bomb could be dropped at any speed and from very high altitude, out of the reach of most AAA.

The LGB was not perfect, and anything that hampered visibility could degrade it, but it was by far the most efficient guided bomb in the inventory. However, lasers do not penetrate clouds and, given the weather patterns in Southeast Asia, this restricted when laser-guided bombing could be conducted. Soon the weather forecast became a primary consideration for which targets could be struck. Weather conditions remained relatively good from May to July, allowing 60 percent of the scheduled precision-guided strike packages to be flown. In August, however, the arrival of the monsoon season restricted LGB strikes.

The second part of the Paveway I system was the laser designator. The first was a box-shaped designator, AN/VAT-9/9A Paveway Airborne Laser Designator (ALD), quickly dubbed the "ZOT," which arrived with the bombs in 1968. The ZOT was mounted on a gyro-stabilized mount in the back seat of an F-4 and manually operated by the F-4's back-seater. In operation, the designator aircraft circled the target at a fairly low altitude – about 6,000ft – and the back-seater used the ZOT to point at (or "designate") the target.



The GBU-8 electro-optically (TV) guided bomb had potential because it was a "drop and forget" PGM, but required too much contrast on the TV picture to be consistently effective. The bar running from front to back between the fins was the guidance wires from the TV camera in front to the steering fin in the rear. (USAF)

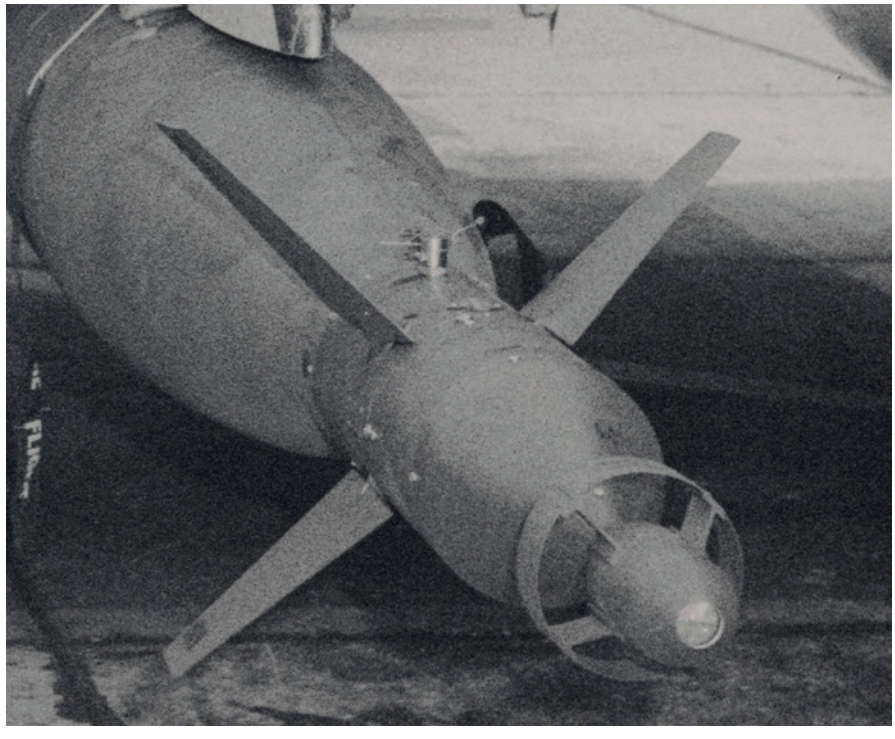
However, the ZOT had two major disadvantages. First, the designator aircraft had to fly an orbit around the target at about 6,000ft to designate for the LGB carriers. While this worked in the low-threat areas of Laos, it would clearly not be suitable in an area of heavy defenses. Secondly, the designator aircraft could not "self-designate," that is, it could not designate a bomb for itself.

The answer was the AN/AVQ-10 *Pave Knife,* an external pod that allowed the designating aircraft to drop its own bombs as well as designate for other laser bombers. The *Pave Knife* pods were almost handmade, with the front section containing a steerable laser with a wide field of movement. The back-seater steered the laser onto the target with a hand controller; the pod could rotate its laser about 180 degrees fore and aft and about the same distance left and right (although it could be blocked by the wing or external fuel tank in the event of a sharp maneuver) so after dropping the F-4 could make a normal defensive maneuver and keep the laser spot on the target.

The first *Knife* pods arrived at Ubon in mid-1971 and a dozen USAF F-4Ds of the 433rd Tactical Fighter Squadron were wired for the pods. The pod was carried on the left inner wing pylon (station number 2), bolted on in an asymmetric configuration which typically included a 370 US gallon drop tank on the starboard wing, and two LGBs, one on the right outboard (station number 1) and one on the left inboard station (number 8), along with a centerline tank, AIM-7s, and an ECM pod.

In combat, the *Pave Knife* designator aircraft would lead a flight of four into the target area, then designate the target for his bombs as he and the rest of the flight began the dive on the target. Normally the flight stayed together in a "pod roll in" to get overlapping protection from the ECM pods. The leader and the rest of the flight dropped their bombs at the same time, and after dropping his bombs the leader could turn and maneuver while the *Pave Knife* pod stayed locked on to the target for the approximately 15 seconds it took for the bombs to hit. The *Pave Knife* was considered the only designator suitable for consistent use in the high-threat areas, but there were only a few of the complex and expensive pods and delivery was slow; at the beginning of April 1972 only six *Pave Knife* pods had been sent to the 8th TFW. When one of the *Pave Knife* F-4s was shot down by a SAM on July 5, while bombing a secondary target out of the chaff corridor, General Vogt, the commander of Seventh Air Force wrote with concern:

> We have built our entire strike program around a few *Pave Knife* pods … We have carefully tailored the force to provide maximum protection for the strike aircraft. This has meant extensive



The Paveway laser-guided bomb was much more successful. It had a small gimbal-mounted lens on the very front that picked up the laser beam that was aimed at the target, and the gimbal maneuvered the canards to hit the target. (Author's collection)

> use of chaff dispensing aircraft and heavy MiGCAP protection. Until yesterday, we have been extremely successful in avoiding losses to SAMs. This has been due to our strike jamming POD discipline and, of course, the use of chaff to protect the strike aircraft in the target area. Of the six [*Pave Knife*] pods available to us, two are considered substandard because of parts shortages, and four are maintained at acceptable standards with maximum [maintenance effort].

Then on July 10 another *Pave Knife* pod was lost on take-off when the 433rd squadron commander's F-4 blew a tire on takeoff and burned on the runway, reducing the total number of *Pave Knife* pods to four (of which only three were reliable). The situation looked critical, so the Air Force sent two pods that were being used in the test program in the US to Ubon.

ZOT patch worn by 433 TFS WSOs who operated the ZOT. The character was the fictional "Eatanter" from the Johnny Hart comic strip "B.C." (Mike Pomphrey)

Chaff

The chaff corridor was the most significant tactical change instituted by the Air Force during *Linebacker*. Chaff corridors were initially intended to protect B-52s for their first missions deep into North Vietnam as part of the escort package in April 1972 and it was found that chaff, in conjunction with ECM, so degraded the North Vietnamese radar that aircraft flying in the chaff corridor were almost untouchable by SAMs and radar-guided AAA.

At times as many as 20 aircraft were necessary to produce a wide enough chaff corridor, especially for B-52s, which was a special challenge because the corridors had to be dropped from 36,000–38,000ft and the chaff-loaded F-4s could barely maintain that altitude. However, on normal PGM missions the chaffers flew at about 20,000 feet and chaff was dispensed by eight to 12 F-4s, each carrying six to nine M-129 chaff bombs and a modified leaflet bomb and dropping one bomb every 20 seconds to form a chaff corridor 5–6 miles wide and about 32 miles long. The F-4s in the chaff flights were separated laterally by 1,000–1,500ft and the altitude difference between the leader and the highest

plane was no more than 500ft. Multiple flights flew with 1 nautical mile lateral distance between them, arranged in echelon right or left. At a designated point, numbers 1 and 2 of each flight dropped the first of their six chaff bombs, releasing the others at 20-second intervals. Numbers 3 and 4 then took over, dropping their bombs in the same manner with the chaff bombs bursting at intervals of about 3 nautical miles to form the corridor.

The chaff from the bombs took about 10–15 minutes to fully deploy and form a corridor, and after about 25 minutes it dissipated and became so thin it was useless, so the strike flights had a 15-minute "window" to hit the target.

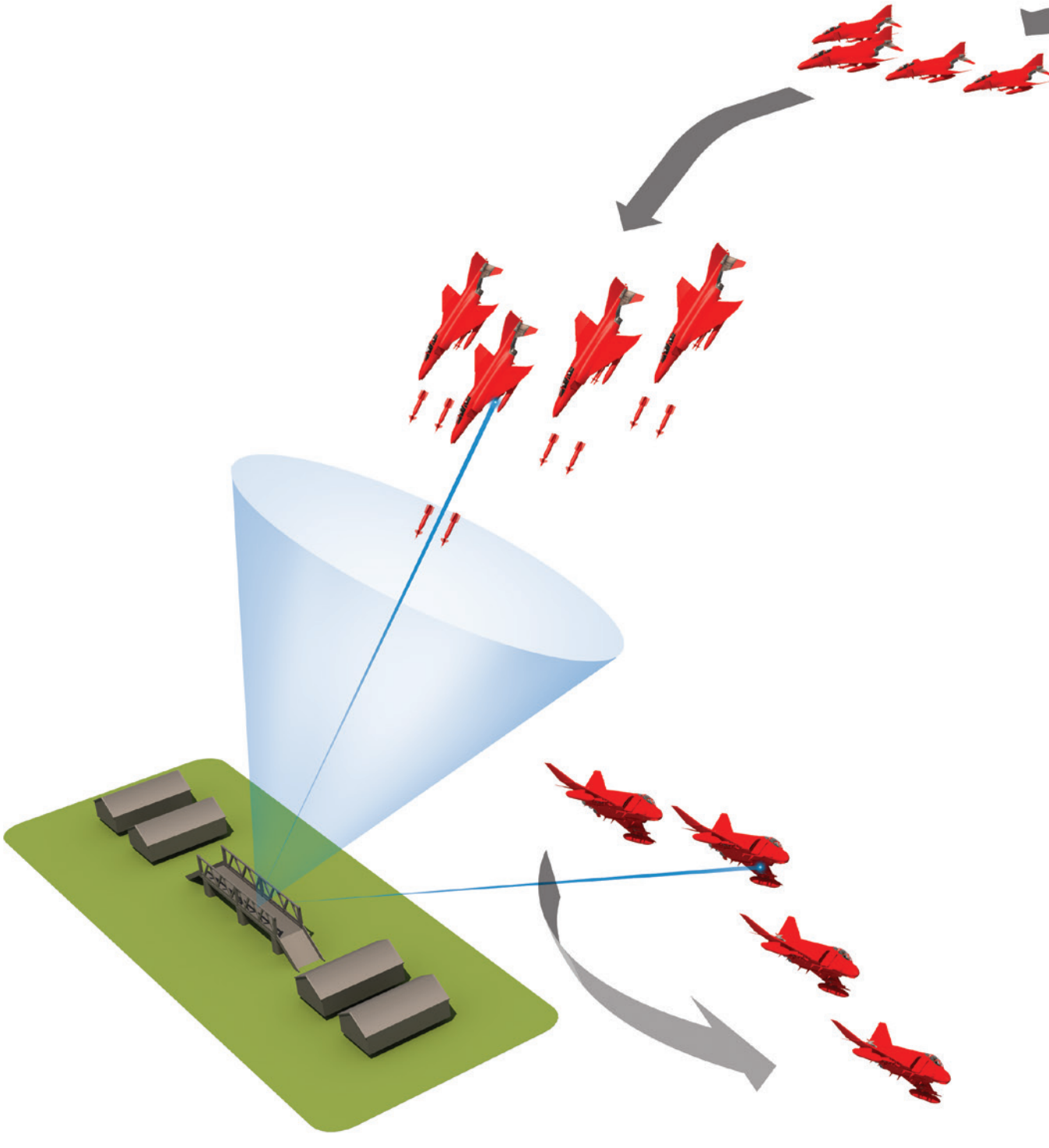
After a time, it was found that the length of this corridor was not sufficient, so on June 13 the ALE-38 chaff dispenser was introduced, giving eight aircraft the capability to produce a continuous chaff corridor about the same width but 105 miles long, while the F-4s still dropped chaff bombs to thicken the corridor.

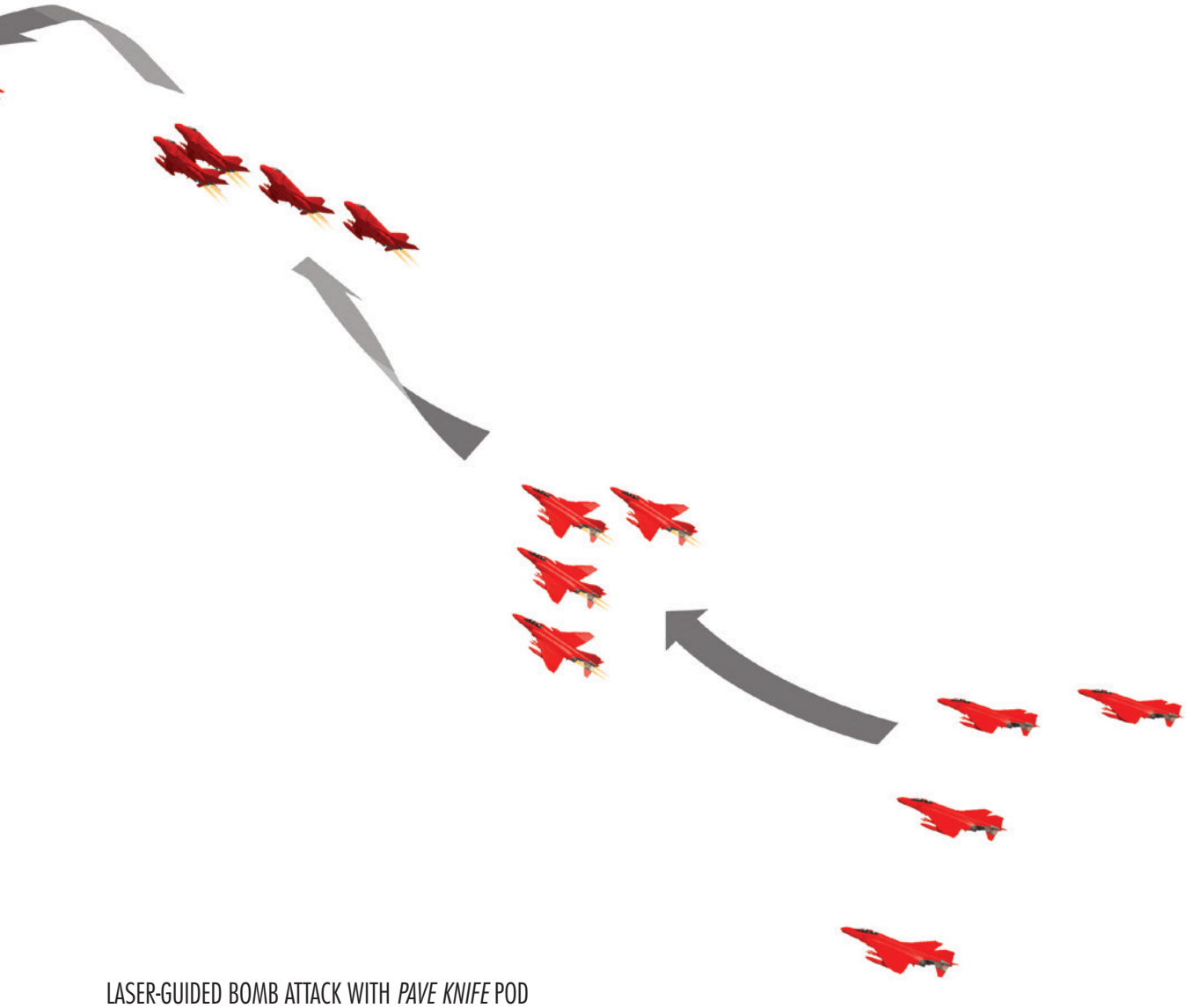
The ZOT was the first F-4 laser designator, which was very accurate, but it forced the designating aircraft to circle the target at fairly low altitude, and the designating aircraft could not guide its own bombs. (Author's collection)

Tactically, there was a price to pay for laying a chaff corridor. The chaff was an arrow pointing to the target and gave the North Vietnamese at least ten minutes to organize their defense, and when the chaff bombers began to drop their chaff they became highly visible and easy to track on the North Vietnamese radar, making the chaff flights vulnerable to SAMs, even though they carried ECM pods. The chaff flights were also an easy target for MiGs because, to lay the corridor, the F-4s had to fly straight and level at a set altitude, at a relatively slow airspeed, and in a straight line. Initially the MiGs left the flights alone, but in late May, MiG attacks were directed toward the chaff flights, and an escort package became a permanent part of each *Linebacker* chaff force.

At first the chaff flights laid their corridor in a formation of eight aircraft line abreast, but as the North Vietnamese adjusted, to avoid stereotyping, chaff-dispensing tactics took many forms, including varying the time of delivery and dividing the chaff formation to dispense inbound and outbound simultaneously. Another tactic was to vary the time interval between release of the first chaff bomb and arrival of the strike force, but this was limited by the need

The most effective designator was the *Pave Knife* pod, which allowed the designating aircraft to "self-designate" and guide its own bomb as well as others; it also permitted it to maneuver away from defenses. There were only six in the theater so protecting them was a high priority. (USAF)





LASER-GUIDED BOMB ATTACK WITH *PAVE KNIFE* POD

There were two major advantages of the *Pave Knife* laser designator pod. First, the *Pave Knife* aircraft could carry its own bombs and designate for them in the attack dive, as well as guiding those of the rest of the attacking flight. Second, the *Pave Knife* had a wide field of view – roughly a half-sphere under the aircraft – and this allowed the flight to maneuver after the bombs were dropped and still keep the *Pave Knife* laser on the target.

During the strike, the attack flight led by the *Pave Knife* aircraft approached the target at about 15,000ft in a fairly widely spaced "pod" formation for maximum electronic jamming protection against SA-2s. When they began their attack, the formation compressed and began an afterburner climb to about 18,000ft, the roll-in altitude. The back-seater of the *Pave Knife* aircraft located the target and put the laser spot on the target, and the reflected laser beam created a conical "basket." Once the flight was lined up in the dive and the laser designator was on the target, the lead aircraft would drop his bombs, and when numbers 2, 3 and 4 saw the leader's bombs come off they would drop theirs too.

Once the bombs were dropped the formation would turn away from the target in a defensive maneuver and simultaneously spread out again to full "pod" formation for protection against SA-2s. The bombs took about 12–15 seconds to impact and the pilot of the *Pave Knife* aircraft had to be careful not to blank the laser beam with his wing, though the *Pave Knife*'s wide field of view still allowed for relatively vigorous maneuvers if required.

The standard configuration for a *Pave Knife*-carrying F-4D: the *Pave Knife* pod on the left inboard station, a 2,000lb LGB on the left outboard station, a centerline fuel tank, a 2,000lb LGB on the right inboard station, and an external fuel tank on the right outboard station. This picture is from the test program. In combat the F-4Ds also carried ECM pods and AIM-7 missiles. (Author's collection)

to have the chaff fully dispersed by the time the strikers arrived.

The chaff escorts either arrived on station as the chaff force commenced laying the corridor or accompanied the chaffers and remained with them throughout the creation of the corridor. In the second option, the escorting F-4s made frequent turns to keep from outrunning the chaff force, which was itself slowed both by the chaff bombs and by the need to weave back and forth in a maneuver pod formation. In making the successive turns, the escort also gained a tactical advantage when changing direction as it had the opportunity to "check six" by looking behind the flights.

MiGCAPs

The first aircraft into North Vietnam for a *Linebacker* mission were MiGCAP F-4s from the 432nd TRW at Udorn RTAFB, the base closest to Hanoi. The 432nd TRW realized that the complex environment over North Vietnam and the maintenance problems of keeping more than a few F-4Ds with *Tree* "peaked" for air-to-air combat dictated that only a small number of crews be designated for MiGCAP. There were at least two four-ship MiGCAP flights and the MiGCAP crews were a carefully selected group. The flight leaders – the "shooters" – tended to be pilots on their second combat tour and were often graduates of the Fighter Weapons School with another experienced aircrew in number 3. The leader always flew an F-4D with *Combat Tree*, and if possible number 3 also had *Tree*. Ideally number 2 and number 4 would be flying F-4Es with an internal 20mm cannon. The preferred missile for MiGCAPs was the AIM-7, which had a history of malfunctions, but they were carefully checked by missile maintenance crews in the 432nd and performed reasonably well for the MiGCAPs.

The MiGCAP flight leaders coordinated with each other about patrol areas, but they

To improve the chaff corridors, the ALE chaff dispenser was introduced in the middle of *Linebacker*. It could lay a stream of chaff that was much more efficient than the chaff bombs, but both were used to create a chaff corridor. (USAF)

were given a great deal of leeway in choosing where to patrol. Their GCI agency of choice was the Navy's *Red Crown*, and patrol areas and altitudes were often selected so *Red Crown* could provide coverage.

MiGCAPs were involved in more than half of the Air Force engagements in *Linebacker* (43 out of 82), and they scored the vast majority of Air Force MiG kills. They also ssuffered: out of the approximately 23 F-4s lost to MiGs during *Linebacker*, six were from MiGCAP flights. But MiGs were not the only threat; operating in small flights at medium altitude outside of the chaff corridor, the MiGCAPs suffered losses from SAMs.

The 432nd TRW used a special group of crews for MiGCAP. In this 432nd TRW public affairs photo, the three Air Force aces walk into the 432nd headquarters with the informal wing mission statement and "KILL MIGS" sign in the background. The front two who usually flew together are (left) WSO Charles B. "Chuck" DeBellevue (six kills) and Captain Steve Richie (five kills), and in the back are (left) Lieutenant Colonel Charles G. "Griff" Baily (two kills) and (right) Captain Jeffery "Jeff" Feinstein (five kills). Baily was Feinstein's pilot for his fifth kill. It illustrates the contrast between USAF and Navy air-to-air training to note that all of Richie's kills were with the radar-guided AIM-7, which the Navy eschewed in *Linebacker*, whereas all of Randy Cunningham's and Willy Driscoll's kills were with the AIM-9 heat-seeker. (USAF)

Wild Weasels and EB-66 jamming

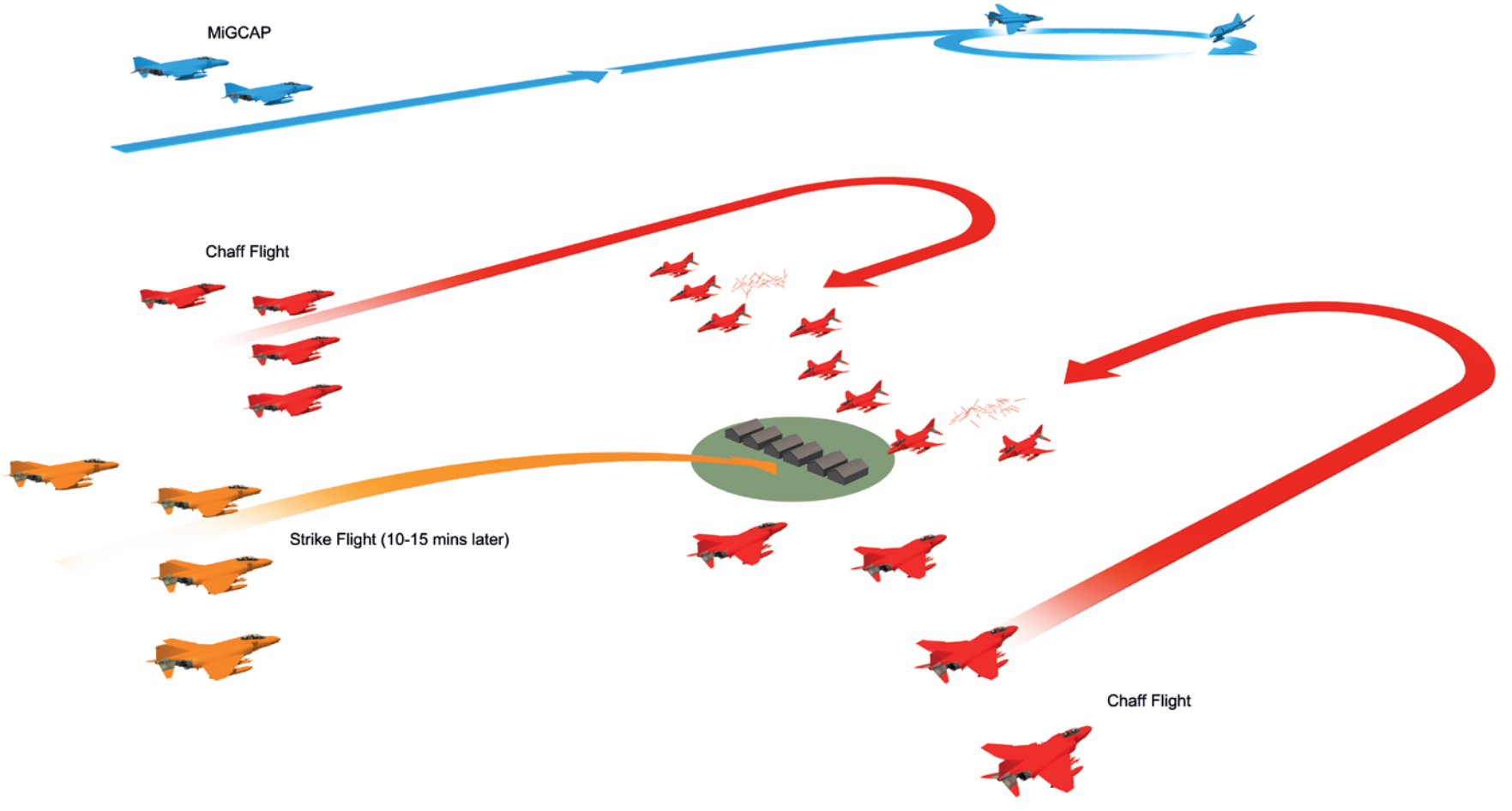
In the early phases of *Linebacker*, pairs of F-105G Wild Weasels equipped with AGM-4S Shrike and AGM-78 Standard Arm anti-radiation missiles sought out *Fan Song* SA-2 SAM radars and launched their ordnance at active radars. Later the F-105Gs paired with F-4Es carrying CBU-52s to form "hunter-killer" teams to destroy SAM sites. This mixed team was not considered a pure hunter-killer and would expend CBU-52s only after the strike/chaff force had egressed the area; the main mission was to keep the SAM radars off air.

Active electronic countermeasures were conducted by EB-66 aircraft from Korat's 42nd Tactical Electronic Warfare Squadron (TEWS) orbiting close to the threat area during *Linebacker*. During *Linebacker II*, the EB-66s were most effective against radars guarding targets on the perimeter of North Vietnam, since their jamming signal grew weak at long range, but they were considered too vulnerable to move within the reach of SAMs. Maintenance of the old EB-66s was a huge problem. The 42nd TEWS, with an average of 19 EB-66s, was hard pressed to fly the 15 sorties per day required of it. In September a shortage of replacement engines caused the number of daily sorties to decline to eight and leaking fuel tanks reduced the daily average of operationally ready aircraft for October to just six, one-third of the number on hand.

Close escorts

The most dangerous *Linebacker* mission was that of the F-4s of the close escort flights who flew behind the strikers or chaffers to try to protect them against MiGs that leaked through the MiGCAPs. The close escort flights were vulnerable because they were tied to F-4s that could not fly at high speed – either the chaffers or the heavily loaded strike flights – so the escorts had to fly slowly and were easy prey for MiG-21s attacking at high speed from behind.

For close escort for the chaffers and the strikers, initially four F-4s were assigned to each flight, flying an "outrigger" formation with a pair positioned on the flanks about 2½ miles back. While it was a good formation for escorting the rather tight strike formations, the outrigger formation presented a problem for the chaff escorts – to cover the wide-spaced chaff flight they had to split into two pairs of two, and Air Force pilots had not been trained to fight in a two-ship formation. This caused many problems throughout *Linebacker*, and a postwar report noted that "the lack of … knowledge of how to fight as a two-ship formation seriously limited mutual support, visual lookout capability, and


MiGCAP
Chaff Flight
Strike Flight (10-15 mins later)
Chaff Flight

OPPOSITE: CHAFF-LAYING TACTICS

Chaff corridors were the single most effective countermeasure to the SA-2 missile during *Linebacker,* and not a single aircraft was shot down by an SA-2 while in a chaff corridor. However, laying these corridors was one of the most challenging missions during *Linebacker*. It required eight to 12 F-4s to fly in a fixed formation, straight and level at a fixed altitude around 20,000 feet, dropping chaff bombs and laying chaff from chaff dispensers to form a corridor 5–6 miles wide and up to 100 miles long, for the *Pave Knife* strike flights to fly safely through to the target.

The chaffers had to lay their corridors at least ten minutes in advance since the chaff from the bombs took that long to fully deploy and form a corridor, and the appearance of the corridor effectively pointed straight to the target and gave the North Vietnamese at least ten minutes' notice of the attack. The spacing inside the chaff formations was important so that the corridor would be the proper width, and the aircraft flew in echelon, separated laterally by 1,000–1,500ft, with the altitude difference between the leader and the highest plane no more than 500ft. The two or three chaff flights flew with 1 mile of lateral distance between them, arranged in echelon right or left.

As the MiGs began to attack, to avoid stereotyping the chaff dispensing flight began to vary its tactics, and since the chaffers and strikers both came from Ubon this was easy to coordinate. One tactic that proved effective – with variations – was that instead of dropping chaff inbound, the chaff flights would bracket the target and then turn back towards the direction of the strike flight, join to the normal formation and drop the chaff corridor outbound, with the escorts remaining behind them to cut off any MiGs. This also allowed the strike flight to delay its entry while waiting for the chaff to deploy, throwing off the timing of the North Vietnamese defenses.

offensive potential."

Once the MiGs penetrated the MiGCAP, they had a relatively easy time. The larger numbers of F-4s that made up the strike or chaff flights were easy to find, closely bunched together at medium altitude, and left a huge smoke trail. The MiGs essentially had their choice of targets, but to make their own escape easier they usually attacked the rearmost flights or the flights on the flanks, which were the escorts.

When the MiGs were sighted – no easy task, since they were so small – the escorts would warn their charges and turn to engage, but realistically they had little chance to engage a MiG-21 that was ripping through their formation from behind at very high speed and then diving away, accelerating as it went.

MiG-21s took a heavy toll of USAF F-4 escorts. Here an F-4 goes down over Hanoi. (Author's collection)

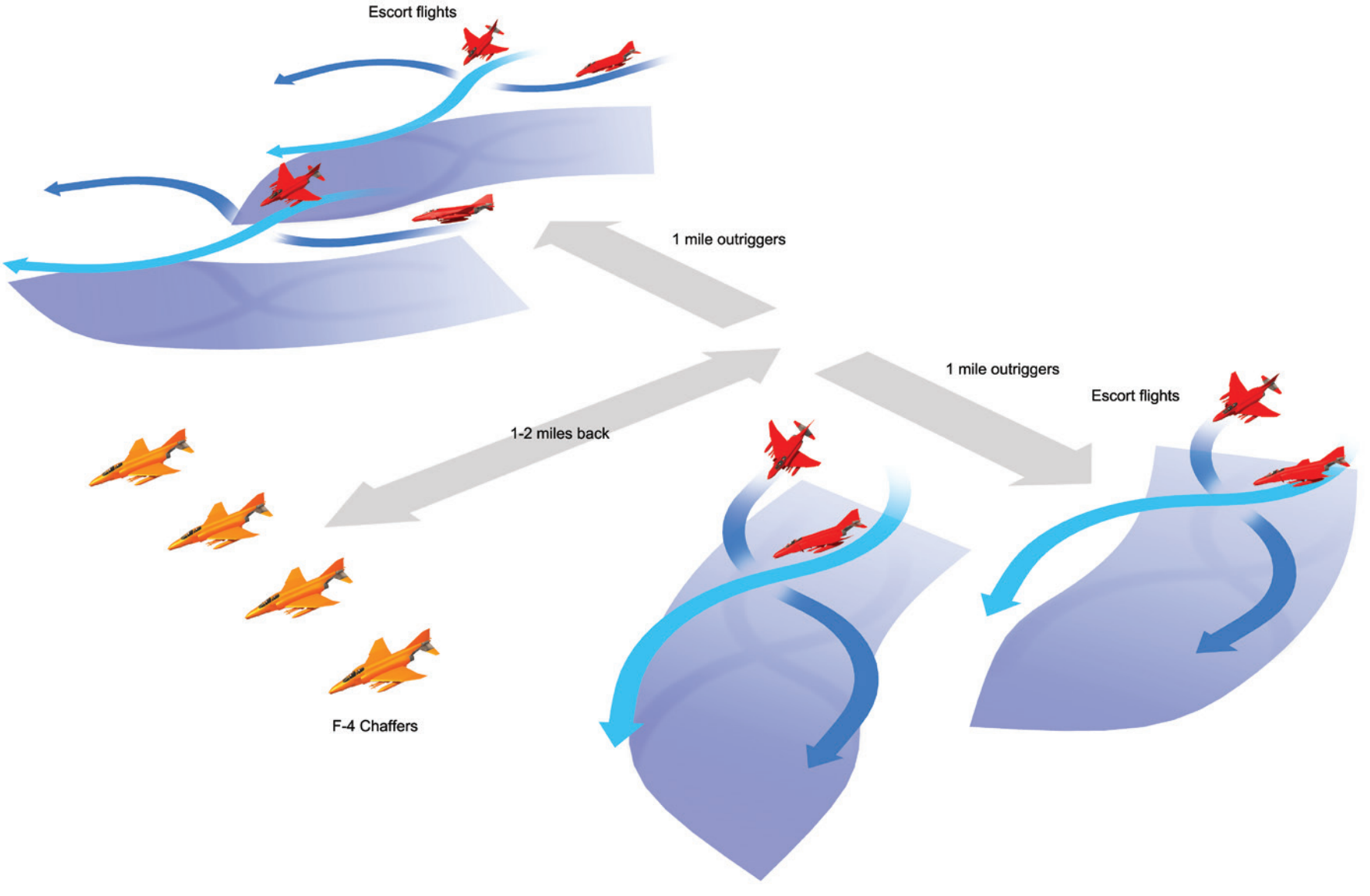
Because they were behind the valuable strike and chaff flights, the escorts took the brunt of the MiG attacks and felt – probably correctly – that their mission was to "soak up" Atolls meant for the more valuable chaffers and strikers. Of the approximately 23 F-4s lost to MiGs in air-to-air combat in *Linebacker*, nine were flying as either chaff or strike escort.

In one sense the escorts of the strike flights were slightly better off than the chaff escorts, because the strike flights had more flexibility in their choice of formations and altitudes, but the strike escorts had a problem the chaffers did not have – they had to wait for the strikers to drop and then escort them out. LGBs especially took a long time to drop, so the strike escorts were in a difficult position. At first they orbited near the target, but this made them easy targets, so soon they moved away and set up a barrier between the target and the nearest MiG threat.

Once the strike flights had hit their targets and were leaving the area, another group of MiGCAP F-4s, called the "egress CAP," passed through the exiting F-4s looking for MiGs that might be trailing them.

Navy Alpha strikes

The concept of the Navy's *Linebacker* Alpha strikes was entirely different from the Air Force's *Linebacker* mission. An Alpha strike was a large strike


Escort flights
1 mile outriggers
1 mile outriggers
Escort flights
1-2 miles back
F-4 Chaffers

OPPOSITE: ESCORTING THE CHAFFERS

Chaff formations and PGM formations had heavy, drag-producing external loads and thus flew at relatively slow speeds in static, non-maneuvering formations. This was a challenge for their escorting flights because MiGs usually attacked from behind at high speed, and if the escorts were flying at the same slow speed as their charges they would have no chance to accelerate fast enough to engage the MiGs.

To keep their speed up but not overrun the flights they were protecting, the escorts flew an "outrigger" position on the outside and behind the formations they were covering. They also used a World War II fighter escort tactic, weaving back and forth behind the chaffers or strikers so they could keep their speed up, and at the same time keep in a close formation that allowed their ECM pods to provide overlapping protection.

However, the F-4 had terrible rearward visibility and the escort flights found that they could not see, much less effectively counter, the small MiGs and their high-speed attacks from behind. To give the F-4s a better chance to spot any approaching MiGs, the escorts began to weave inside the pod formation so that the back-seaters could look behind them for MiGs. Nevertheless, the escort formations suffered the heaviest losses of any group of Air Force fighters during *Linebacker.* Many of the escort F-4 crews felt that they were expendable, and that their main mission was simply to absorb the MiG attacks to keep the MiGs from reaching the valuable chaffers and the even more valuable *Pave Knife* PGM formations. This was to some extent true. North Vietnamese MiG pilots said after the war that they really did not have any definite targets but attacked the first F-4 formations they saw, and the escorts, outside and behind the main formations, were usually the first F-4s they came upon.

of a "deck load" of aircraft designed to put as much ordnance as possible on a high-value target in the shortest possible time and with the least amount of risk. A "deck load" of aircraft generally consisted of about half of the aircraft aboard, perhaps about 30 aircraft.

An Alpha strike consisted of squadrons from the same carrier, which meant that coordination was much easier. An Alpha strike had strike aircraft (A-6s, A-7s, or occasionally A-4s), F-4 escort/flak suppression, Iron Hand A-7Es, EKA-3Bs that were both tankers and ECM, and RA-5 reconnaissance aircraft. A carrier could only handle two or three Alpha strikes per day since these missions were quite demanding on the aircrews, maintenance personnel, and ship's supply system.

The carriers were assigned to Yankee Station, about 100 miles from Haiphong. Typically, three carriers operated on Yankee Station and with these three carriers the Navy could theoretically launch a total of over 250 aircraft a day for three missions into North Vietnam, the majority of the aircraft bomb-carriers, while the Air Force was flying one mission a day with 16 bombers.

One of the most effective SAM suppression tactics was the "hunter-killer" team of an F-105G Wild Weasel and two F-4Es carrying cluster bombs. Here a "hunter-killer" team meet their tanker on their way to the target. Since their mission was to protect the force they did not actively hunt SAM sites until the strike force departed. (National Museum of the USAF)

The EB-66 was the Air Force's standoff jamming platform but was very old and suffered from a variety of maintenance problems, especially engine problems that caused one to crash at Korat during *Linebacker*. (Author's collection)

Sometimes some very large joint air raids were staged coordinating aircraft from three US Navy carriers in the Gulf of Tonkin and the US Air Force flying from airfields in Thailand. This could amount to between 90 and 100 Navy aircraft and a similar number from the Air Force, but for the bulk of *Linebacker* most of the Air Force strike was support aircraft. During these very large raids either the Navy or the Air Force would strike first, and the other service would re-strike the target 15 minutes later. The planning for these strikes was extensive, and typically a Navy Alpha was in and out in no longer than two minutes, while as noted an Air Force strike took much longer.

The Alpha strike leader, usually the carrier air group commander (CAG) or his deputy, would pre-plan the mission and provide a detailed briefing to the crews. All the aircraft were launched as quickly as possible, climbed to the rendezvous altitude directly over the ship, then conducted a running rendezvous. The F-4s typically took off first because they needed to refuel after taking off, and the strike would fly to the target.

The in-route portion of the flight for the strike group was normally conducted at 20,000ft and around 475 knots. This was in deference to the A-6s who were carrying almost the same load as three of the other planes. As the strike formation approached the land – "feet dry" – the strike leader would accelerate and descend to the roll-in altitude, typically around 15,000ft. The SAM threat was greatest during the ingress/egress, that of AAA in the target area.

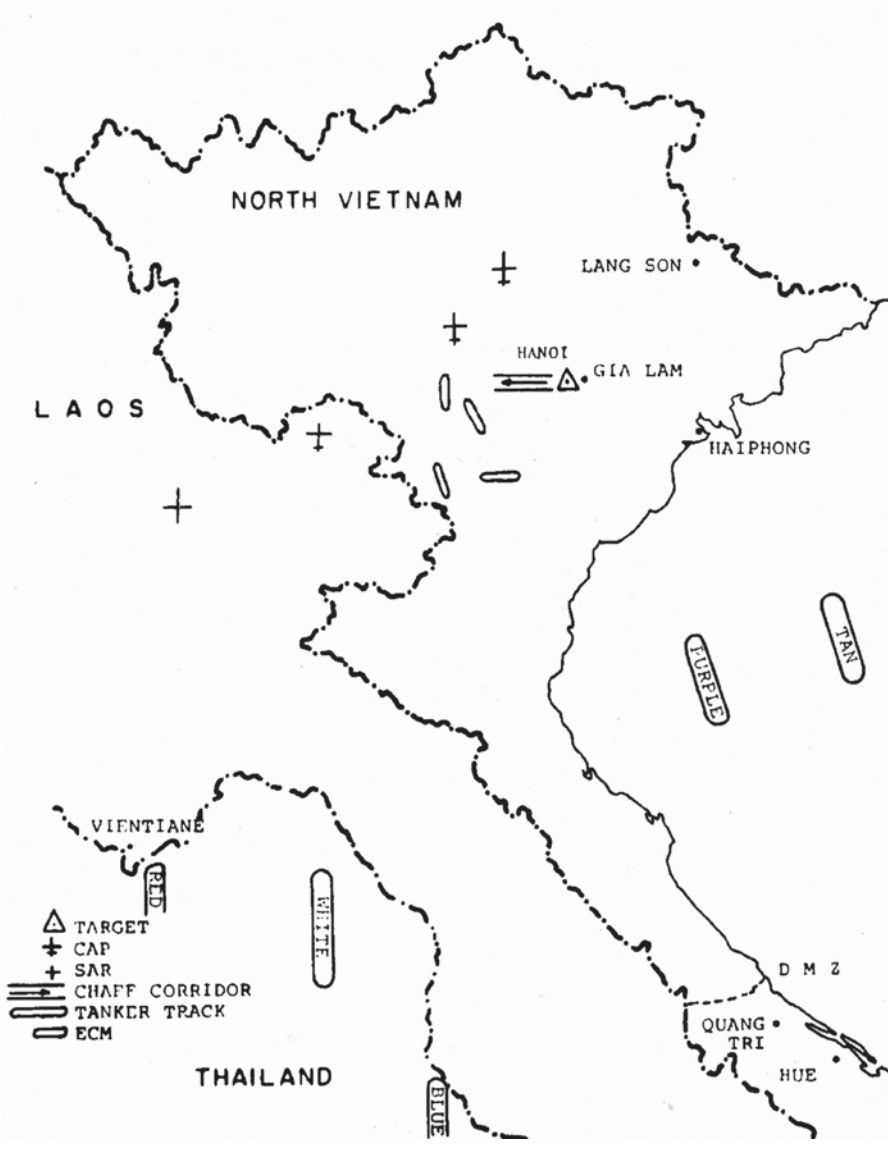
The MIGCAP went in first and set up orbits around 15,000ft at high speed between likely threat airfields and the Alpha formation, and an Iron Hand SAM suppression element of two A-7Es with Shrike missiles set up a racetrack orbit with one aircraft always pointed at or near the anticipated SAM site.

The strike group circled the target as the individual two-ship elements of the strike made a formation roll-in following the strike leader's plan. The elements attacked their designated targets and then leveled off at about 3,500ft above the ground for a high-speed exit for the coast.

During the egress the elements would generally operate in two-ship sections and jink out of the area to minimize the risk of being hit by ground fire and to clear behind them. Once the bombers had cleared the target area, the MIGCAP would follow while looking for trailing MiGs.

Because of the different tactics, on Route Package VI *Linebacker* missions, the Navy suffered most of its losses to AAA and SAMs and relatively few to MiGs. The Air Force, on the other hand, suffered most of its losses to MiGs and very few to SAMs or AAA. This was because the Air Force strikes flew in large strike packages behind a chaff corridor which negated the SA-2 threat and dropped its LGBs from very high altitude above the AAA. On the other hand, these large, unwieldy formations flying at high altitude were very vulnerable to MiGs.

During the five-and-a-half months of *Linebacker*, the Navy contributed more than 60 percent of the total sorties in North Vietnam, with 60 percent of this effort in the "panhandle," two large

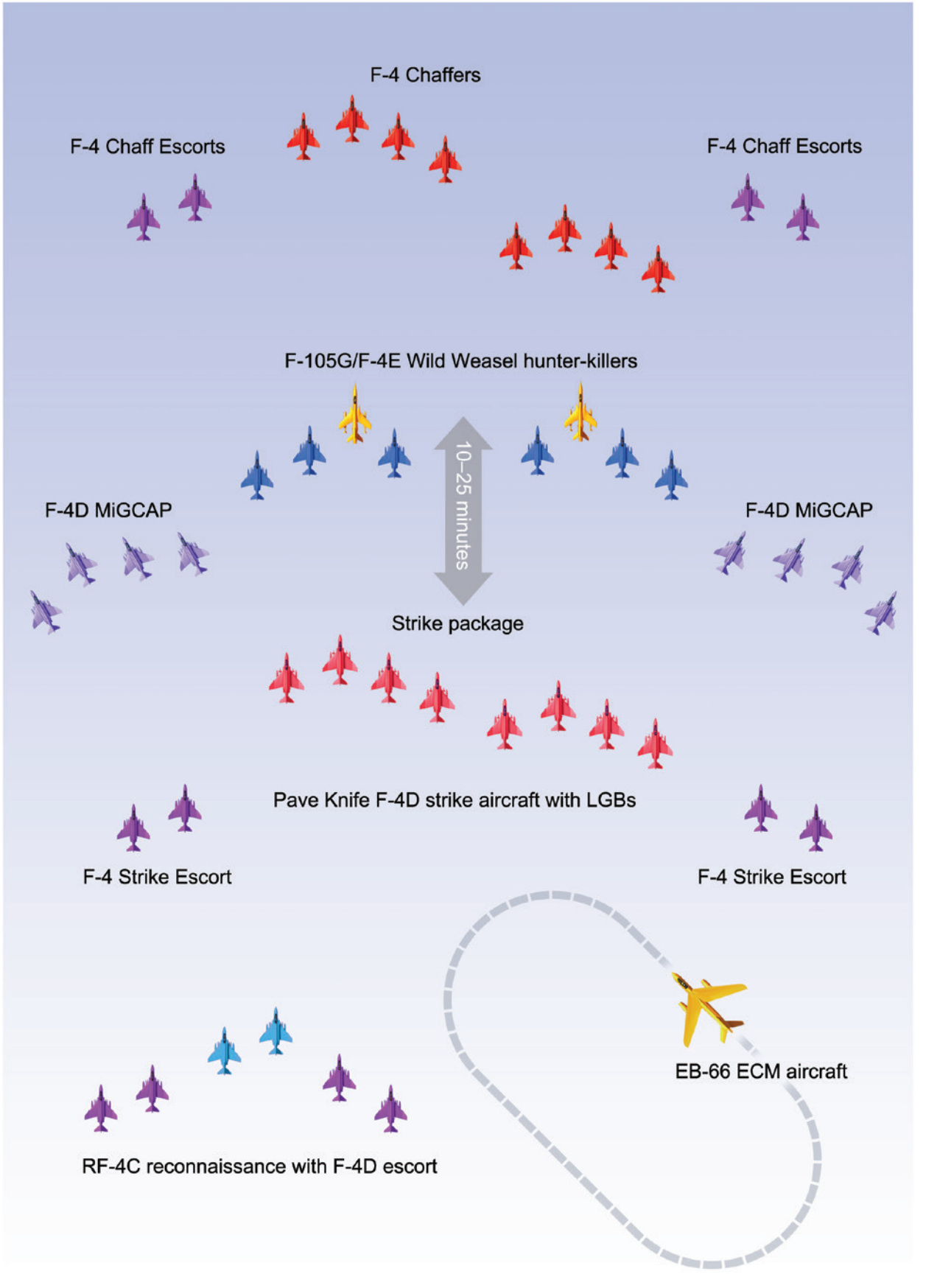


The large Air Force *Linebacker* missions took a great deal of preparation. This map shows the support systems that had to be in place before the mission launched. For this generic mission, the target is in the Hanoi area and will combine a "feet wet" entry/exit from the Gulf of Tonkin and a "feet dry" entry/exit from Thailand. First on the scene are the tankers set up in five "anchors", two in the Gulf (PURPLE and TAN) and three close to the Thai/Laos border (RED, WHITE and BLUE), The first aircraft to be refueled will be the two MiGCAP flights who will drop off the tanker and then proceed to the north and northwest of the target to block any MiG attacks from those areas. Next off the tanker will be the Wild Weasels and their F-4E escort, followed by EB-66 jamming aircraft, which do not require refueling and orbit just across the North Vietnamese border. Search and rescue aircraft, "Jolly Green" HH-53 and their A-1 Skyraider "Sandy" escorts set up on the border, and they also do not require air refueling. Next off the tanker are the F-4Ds laying the chaff corridor, which for this generic mission will be laid from west to east. Once they are inbound the strikers will follow about ten minutes later. (USAF)

regions between Hanoi and the DMZ. Most Navy attack sorties in North Vietnam fell into two classes – armed reconnaissance and strike. The former was usually directed against targets of opportunity with three main areas proscribed – near Hanoi, Haiphong, and the Chinese border. Strike operations were pre-planned and usually directed at fixed targets. Principal Navy aircraft were the A-7 and A-6, which accounted for roughly 60 and 15 percent respectively of the Navy's attack sorties. About 25 percent of the Navy's effort was at night.

In addition to the Alpha strikes on Hanoi, the Navy carriers' main mission was to conduct interdiction missions in Route Packages II, III, IV, and V, which were choked with vehicles trying to resupply the PAVN forces in the South.

Overall, the initial laser-guided air strikes were operationally remarkably successful and dropping the bridges effectively cut the North Vietnamese rail system into thirds, forcing the shuttling of goods from the Chinese border to Hanoi, Hanoi to Thanh Hoa, and Thanh Hoa to Vinh. Over 1,000 air strikes were conducted along the lines of communications from Hanoi to their troops in the south by Air Force and Navy jets employing freefall munitions


F-4 Chaffers
F-4 Chaff Escorts
F-4 Chaff Escorts
F-105G/F-4E Wild Weasel hunter-killers
10–25 minutes
F-4D MiGCAP
F-4D MiGCAP
Strike package
Pave Knife F-4D strike aircraft with LGBs
F-4 Strike Escort
F-4 Strike Escort
EB-66 ECM aircraft
RF-4C reconnaissance with F-4D escort

OPPOSITE: TYPICAL USAF MISSION COMPOSITION DURING *LINEBACKER*

The main characteristic of the Air Force *Linebacker* PGM missions into the Hanoi area, known as Route Package VI, was the enormous size of the force, which mainly consisted of support aircraft. The large support force was considered necessary to protect the few – initially six, and at one point down to four – *Pave Knife* laser guidance pods which were essential for dropping laser-guided bombs in defended areas.

The aircraft came from four different bases in Thailand, and the attack had to be coordinated the night before by planners from each base using a basic plan sent by Seventh Air Force in Saigon, a plan that was sent by teletype and thus very slow. Once the bases had the plan, the crews were briefed on their particular mission before they took off. Coordination was fairly easy at some bases, such as Ubon (which had the chaff droppers and the squadrons using PGMs), Udorn (whose mission was mainly MiGCAP and whose flights operated independently), and Korat (whose anti-SAM Wild Weasels also operated independently). The main challenge was for the escorts, which came from different bases and generally had little contact with the flights they were escorting before the mission.

All the flights on the mission took off and met tankers over Laos for refueling and for the escorts to find and join with their proper flights. It was at this point that the mission was first detected on North Vietnamese radar and the alerts to their defenses went out. Sometimes an RF-4 flew into the target area to look at the weather and at this point several EB-66s began standoff jamming, but they were usually too far away to be effective.

The first major forces into North Vietnam were the *Combat Tree*-equipped MiGCAPs, followed by Wild Weasel anti-SAM aircraft, and then the chaff bombers and their escort. The PGM strike force and its escorts dropped off the tanker about 15 minutes later to arrive in the target area after the chaff corridor had fully formed.

Once the strike was complete, another set of MiGCAPs might enter the area fully fueled to cover the chaff and strike flights on their way out, and two RF-4s and their escort would overfly the target for post-strike bomb damage assessment photos.

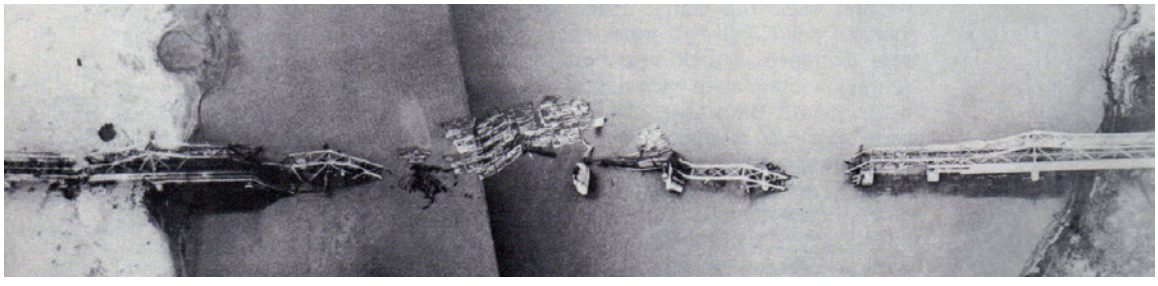
While the coordination problems were obvious and enormous, beginning in August the wings began face-to-face meetings after each mission to discuss problem areas. After these meetings began coordination improved and, more importantly, losses fell precipitously.

aimed at rail yards, rolling stock, bridges, and storage facilities. This combination of precision and conventional bombing effectively disabled the North Vietnamese rail system.

The battles continue

After failing to down the Doumer bridge in the center of Hanoi on May 10, the next day the Air Force sent a very small strike force, four F-4Ds, with a light escort to try again to knock

One of the advantages of Navy Alpha strikes was that they could come in low, below the North Vietnamese radar coverage, like these F-4s leading in a strike in the Haiphong area. (William "Charlie" Carr)



The accuracy of the LGB provided the Air Force with some stunning results. Here is the post-strike picture of Hanoi's Doumer bridge, dropped on May 11. (AFHRA)

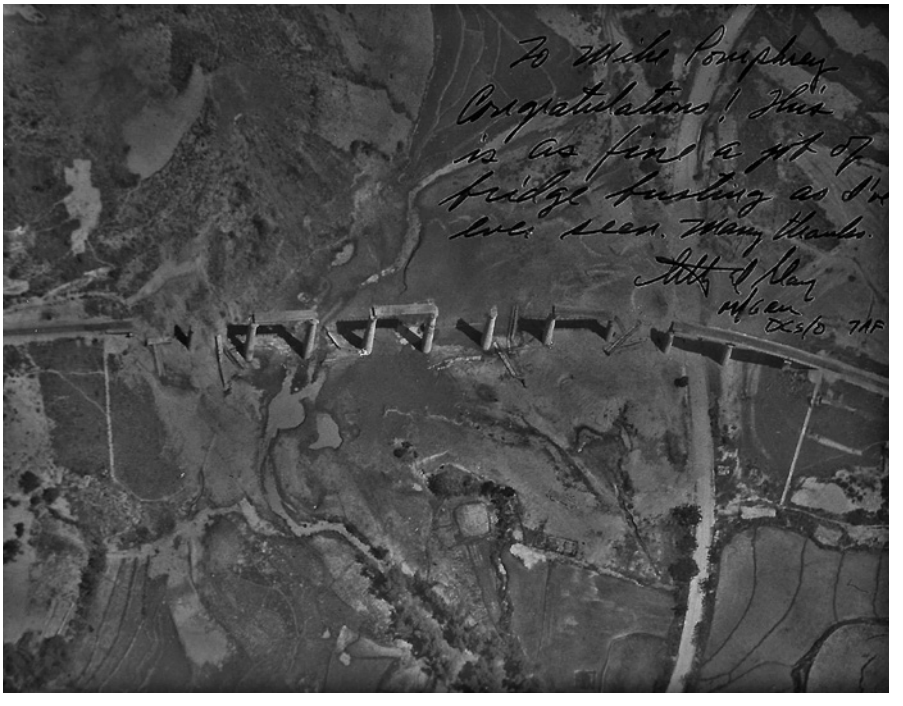
out the bridge with LGBs. On this raid one F-4D carried two 3,000lb GBU-11 LGBs, known as "Fat Albert," which had a light casing but had twice the explosive of a 2,000lb LGB and could make a crater 41ft wide and 13ft deep.

From the beginning the mission had all the earmarks of a catastrophe. Due to confusion over the target times, both the chaffers and the fighter escort had left the area when the LGB-carrying F-4Ds arrived to bomb. However, it appears that this small, unescorted flight was mistaken by the North Vietnamese for a reconnaissance flight. There was no defensive reaction and all eight bombs hit and dropped the bridge into the Red River.

On May 12 the 8th TFW PGM bombers dropped four more railroad and two highway bridges, and on May 13 the Air Force returned to a bridge that had been its nemesis during *Rolling Thunder*, the Thanh Hoa Bridge. The Air Force had sent a combination of EOGBs and LGBs to the bridge on April 27 with a full escort package including chaffers, but the day was very cloudy – too cloudy for LGBs; however, it was clear enough for the EOGBs to get good contrast and five hit on or near the bridge, damaging but not downing it.

For the May 13 mission, the Air Force sent 14 LGB strikers with nine 3,000lb LGBs, 15 2,000lb LGBs and 48 500lb conventional bombs. The force dropped the bridge – a bridge that had withstood literally thousands of attacks and cost at least five aircraft during *Rolling Thunder* – and the mission became a poster child for the massive Air Force PGM strikes.

Another primary bridge target was the 1,500ft-long Lang Giai bridge on the northeast rail line between Hanoi and China just 20 miles from the Chinese border. It required special permission from the JCS to bomb, and after permission was given it was dropped on May 25. (Mike Pomphrey)



This post-strike picture was given to one of the WSOs who led the raid, Mike Pomphery, by the Seventh Air Force Director of Operations, Major General Alton Slay. It reads: "To Mike Pomphery, Congratulations! This is as fine a job of bridge busting as I've ever seen. Many thanks Alton Slay, MGen DCS/O 7AF." (Mike Pomphrey)

On May 18 the Air Force struck a large POL storage area just northeast of Hanoi; using LGBs, the strike flights destroyed more than 5½ million gallons of fuel.

One of the primary bridges on the *Linebacker* target list, the 1,500ft-long Lang Giai bridge on the northeast rail line between Hanoi and China, was just 20 miles from the Chinese border and thus required special permission from the Joint Chiefs of Staff to bomb. Permission came quickly and on May 25, 20 F-4Ds from Ubon with a full escort attacked the bridge with EOGBs and LGBs. The weather was very cloudy and many of the bombs missed, but at least 15 hit, providing one of the most spectacular images of the *Linebacker* interdiction campaign.

The MiGs intervene

After the sharp air battles in early May, the VNPAF began moves to counter the new American tactics. The chaff corridors seriously disrupted the SAM defenses, and it was clear the MiGs would have to carry the bulk of the defensive load against Air Force PGM strikes.

But there were problems. Many of the pilots were young and did not have combat experience, and the low-flying MiGCAPs with *Combat Tree* (though the VNPAF was unaware of *Tree*'s existence) were causing problems for the Vietnamese GCI controllers, who also had not seen real combat since 1968. As a result, the VNPAF cut the numbers of aircraft on alert in half, from 32 to 16, to make sure the GCI controllers were not overwhelmed by too many fighters. This was very important, because the VNPAF used very close control for their fighters, and the pilots had to do exactly as instructed.

The MiGs begin to attack the large, unwieldy Air Force formations entering Route Package VI, and poor Air Force air-to-air tactics and training began to show up. On May 20 a *Combat Tree* F-4D MiGCAP was attacked by two MiG-21s; in a hard break to avoid the MiGs, one of the F-4s – untouched by MiG fire – went out of control and crashed.

On May 26 an Air Force strike of 16 LGB-carrying F-4s was scheduled to attack the Son Tay storage area, and as normal the force was preceded to the target by three chaff flights and their escort. MiG-21s attacked the chaffers and their first attack forced one flight of

When President Nixon met with Soviet General Secretary Brezhnev in May, Nixon was very pleased to hear Brezhnev tell him not to worry about the new bombing strikes on North Vietnam. (NARA)

chaffers to jettison the chaff bombs, then a second attack forced three more chaffers to do the same. Chaos reigned, and a total of 20 missiles were fired. There were no hits by either side, but after the MiG attacks only five of the 12 chaffers completed their mission. A postwar report said: "Coordination and discipline between the F-4s broke down completely."

This was the first time the MiGs had attacked the chaff flights, which began to experiment with different formations both to make a better corridor and for protection against MiGs. Initially they flew eight aircraft line abreast, but this formation was hard to maneuver and therefore very vulnerable to MiGs; it was later switched to one flight of four leading and one flight trailing by 3 miles and offset to the side, so the entire force was more maneuverable and the trailing flight could fire at MiGs that attacked the first flight.

Politics

On May 22 Nixon arrived in Moscow for a week-long series of negotiations with General Secretary Brezhnev. At the beginning of their first face-to-face meeting, as expected Brezhnev complained about the bombings of North Vietnam and added that these had almost caused the summit to be canceled. But once he had finished this almost *pro forma* complaint about US policy against a Soviet client, the rest of the meetings went smoothly, culminating in the signing of both the Anti-Ballistic Missile Treaty and the SALT I agreement.

GCI Control

Since World War II the Navy had paid a great deal of attention to GCI and control of fighters to protect its carriers, and it had a very efficient system in place at the beginning of the Vietnam War. In 1966 the Navy established a Positive Identification Radar Advisory Zone, or PIRAZ, in the northern Gulf of Tonkin with a GCI command and control ship called *Red Crown* about 30 miles off the North Vietnamese coast between the intended land targets and the attack carriers. This GCI control ship was normally a cruiser but could be a frigate and the ships rotated in and out about every 30 days. *Red Crown* ships carried *Talos* long-range surface-to-air missile systems for protection against air attack (and occasionally to shoot down a careless MiG going back and forth between airfields). They were also under the protective umbrella of the carrier's combat air patrols around the clock, and each PIRAZ ship would have an accompanying destroyer for protection against motor torpedo boats.

Red Crown's search radar coverage extended over North Vietnam and could monitor and keep track of all air traffic in the PIRAZ area, especially around Hanoi and Haiphong, and its radar was the closest American radar to North Vietnamese airfields and in the best position to offer radar information to American aircraft. Additionally, *Red Crown* had excellent, experienced GCI controllers, QRC-248 IFF interrogators to identify MiGs, and Vietnamese linguists listening to North Vietnamese GCI controllers. *Red Crown* could see well into the Red River delta up to Hanoi, but its coverage deteriorated further away because of the terrain.

When not closely controlling fighters, information on the general location of MiGs was given by their distance and direction from Hanoi, known as "Bullseye," and a color code system used to identify them – "Red Bandits" were MiG-17s, "White Bandits" MiG-19s, "Blue Bandits" MiG-21s, and "Black Bandits" MiGs that were low on fuel.

Red Crown's excellent GCI controllers were not only used by the Navy but were by far the favorite controllers for Air Force MiGCAPs because they could provide close control and guidance to MiGs. These controllers revealed another aspect of the Navy's emphasis on air-to-air combat. Navy controllers had extensive training in controlling fighters in air-to-air combat, and one *Red Crown* GCI controller, Chief Larry Nowell, eventually was credited with controlling US fighters – Air Force as well as Navy – to 13 MiG kills from March to May 1972 and for saving four F-4s. Nowell was the first enlisted man in US Navy history to receive the Distinguished Service Medal for combat action.

The Air Force had no really useful GCI but did have seven EC-121Ts that contained both QRC-248 and Rivet Top electronic suites with Vietnamese linguists based at Korat. These provided radar support flying a Laotian orbit and later an orbit in the Gulf of Tonkin using the callsign *Disco*. *Disco* had limited radio range, and because of the characteristics of the airborne system – the need to turn in orbit and the slow movement of the radar antenna – had only a limited ability to control US fighters because the large USAF raids saturated its capabilities. The *Disco* EC-121s – with only five radios, eight frequencies, and two controllers simply could not keep track of everything that was taking place. Generally *Disco* was not considered useful because of its poor radios and because its radar could not see to Hanoi.

June 1972: the MiGs dominate

In early June the air-to-air war was slow, with only a few inconclusive engagements. The LGB strikes continued, and in raids on June 1 and June 5, 8th TFW laser bombers knocked out Hanoi's Bac Giang power plant. On June 13 the Air Force suffered another loss in a

Knocking out the Doumer bridge

Hanoi's almost mile-long Doumer bridge, aka the Long Bien bridge (Cau Long Bien) was considered one of the key choke points in the movement of supplies from China and Haiphong, and as such had been attacked numerous times during Operation *Rolling Thunder*. It was also the first target for the Air Force's PGMs when *Linebacker* began on May 10, 1972.

The May 10 strike damaged the bridge but did not bring it down, so another, smaller strike was sent to attack the bridge the next day. This strike involved just four F-4Ds from the 8th TFW at Ubon RTAFB using the AN/AVQ-10 *Pave Knife* pod. On this raid three of the F-4Ds carried 2,000lb GBU-10 LGBs, but one F-4D carried two 3,000lb GBU-11 LGBs – known as the "Fat Albert" – which had a light casing but contained twice the explosive of the GBU-10, and could make a crater 41ft wide and 13ft deep. This force was to be escorted by an equally small force of chaffers and escort fighters.

Even though the bombers, chaffers, and escorts were all from Ubon, there was confusion over the time over the target, and both the chaffers and the fighter escort had left the area when the LGB-carrying F-4Ds arrived to bomb. However, it appears that this small, now unescorted flight was mistaken by the North Vietnamese for a reconnaissance flight. The LGB flight leader pressed on, and since there was little defensive reaction the attack was methodical and all eight bombs hit, dropping the Doumer bridge into the Red River. The bridge was not fully repaired for a year.

well-coordinated attack. Sparks, a MiGCAP flight, was being vectored toward MiG-19s at medium altitude when it missed a radio warning call as two MiG-21s attacked from below. Sparks 4 fired AIM-7s at a MiG but missed a kill because of poor coordination between the front-seater and the WSO.

After this flight the criticism of the Air Force fluid four formation was vehement. The flight leader (who went on to be a multiple MiG killer) said after this loss:

> We brought the wingmen in to 1,000 feet [from about 2,500ft, standard for fluid four], almost a welded wingman, to keep them from getting shot down … A wingman never did me any good in *Linebacker*. I always worked with the number 3 man – the wing man was always just another airplane in the air. I would have preferred to have gone into Route Package VI, under the conditions we were operating, with two highly qualified crews [flying Navy "loose deuce"] rather than fluid four … I had to spend 90 percent of my time keeping somebody in the flight from getting shot down [and] could not go about the business of MiGCAP.

On June 21 the MiGs continued to press the chaffers. On the afternoon mission Iceman, a flight of four F-4Es, was escorting a chaff flight when it was attacked by two MiG-21s from the 921st Fighter Regiment flying out of Noi Bai. One MiG-21 pilot, Do Van Lanh, fired two RS-2 Atolls and one of the flight commented that "it went straight up his tailpipe and just blew it apart. The tail came off and was floating down [and] there was chaff all over hell."

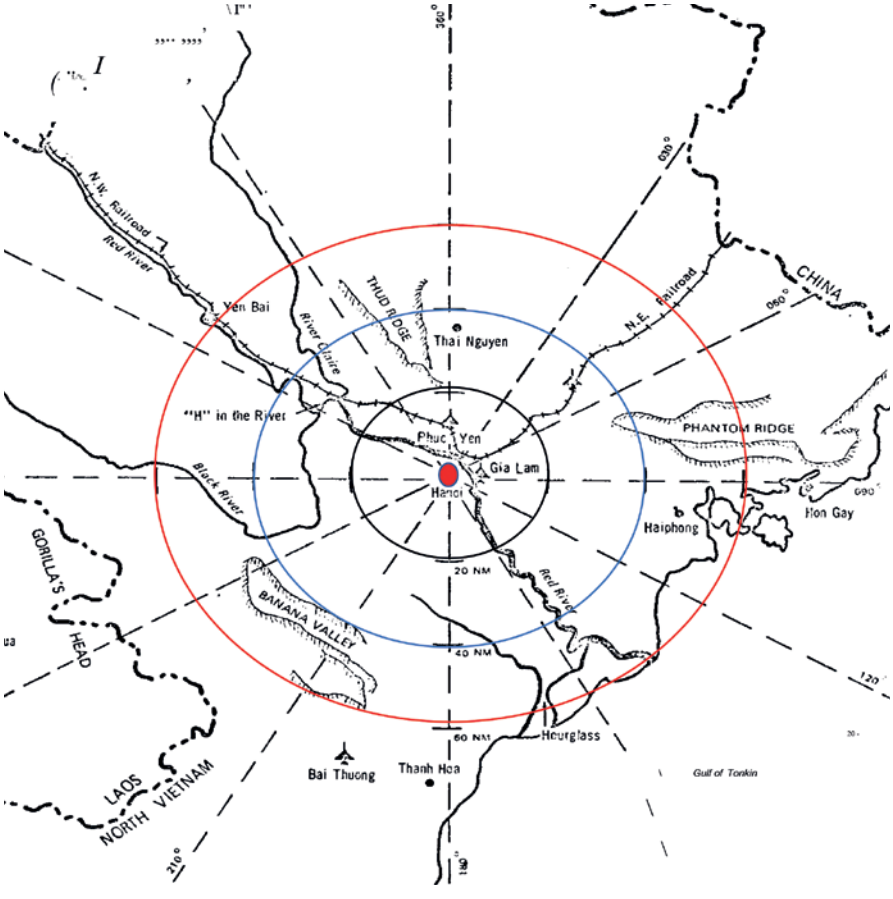
The number three F-4 in the formation pulled behind one of the MiGs and tried to fire but he had a complete systems breakdown and could not fire a missile; however, he never thought of telling his wingman to take over and fire. The wingman later commented in a masterpiece of understatement that "It was kind of frustrating to sit there with a full system lock-on and a full load of missiles" and not be allowed to fire.

In mid-June 1972 the weather over North Vietnam changed, and normally there was a mid-level (10,000ft) cloud deck over much of Route Package VI. The MiGs began to fly under this deck where they could not be seen, then on a call from GCI they would climb up through the cloud deck to surprise the Air Force strikes. At first the MiGCAP F-4s continued to patrol at their usual altitude above the deck, but the new MiG tactics soon began to cause losses.

On June 23 an F-4 MiGCAP flight with *Tree* was intercepted by two MiG-21s from the 927th Fighter Regiment in a coordinated pincer attack. The MiG-21s came in below the cloud deck and popped up through the clouds to attack; one attacked from the left of the formation and one from the right, and the F-4s were caught in between. The F-4s saw both the MiGs, and one pair of F-4s turned into one MiG and the other pair into the second MiG. The fourth F-4 was lagging, and one of the MiG-21s flown by Nguyen Van Nghia, a future VNPAF ace, fired an Atoll. The missile missed, but as the F-4 broke to avoid the missile the poorly trained pilot lost control and the crew had to bail out.

But the worst was yet to come. On June 27 an F-4 chaffer was shot down by an SA-2 in the target area, and as the force was departing, four F-4s on MiGCAP received indications of a SAM launch and maneuvered to avoid the missile; no missiles were fired, but in a "perfect example of a coordinated SAM/MiG attack," while the F-4s were looking for the SA-2, they were attacked by a single 927th Fighter Regiment MiG-21 flown by another future ace, Nguyen Duc Soat, who downed an F-4, and the decision was made to rescue the crew.

Unfortunately, the North Vietnamese were apparently listening to the radio calls starting the rescue attempt and made a full-scale attempt to stop it, turning the rescue into a disaster. A little over three hours after the second F-4 was downed, a flight of F-4Es covering the downed crew called that it was low on fuel and began to exit the area. As it left, it was attacked by two MiG-21s from the 921st Fighter Regiment flown by Bui Duc Nhu and Ha Vinh Thanh, and two more F-4s were shot down. It was the worst air-to-air day for the



When control agencies such as *Red Crown* gave MiG locations, the location was given in terms of a radial and distance from the center of Hanoi, known as "Bullseye." This was in order to make sure that everyone receiving the information had the same location. A typical call would be "Bandits, Bullseye 240 for 25." When known, the call would identify the MiG type, "Red Bandits" were MiG-17s, "White Bandits" were MiG-19s, "Blue Bandits" were MiG-21s, and from time to time the controlling agency could give altitude – high, medium or low – or call out "Black bandits" – MiGs that were low on fuel and should be easy prey.
This map was in every squadron and crews memorized it and associated the radial and distance with a known landmark, and in practice when there was a MiG call "Bandits, 240 for 40" the crews would immediately head for Banana Valley. The crews also set the center of Hanoi in their inertial navigation system (INS) so that on the days when the weather was bad they could still follow the control agencies calls. (USAF)

Americans in the Vietnam War, with MiG-21s shooting down three F-4s for no MiG losses, and another F-4 lost to a SAM.

So far during *Linebacker* the Air Force had lost a total of 13 aircraft in air-to-air combat while shooting down 17, but in June seven Air Force aircraft were lost to MiGs for only three kills, and during the last week of the month the Air Force lost five F-4s to MiGs without a kill in return. The trend was going the wrong way, and the losses to MiGs forced the Air Force to further increase the size of the support package by increasing the number of escorts, making the ratio of strike escorts to strikers 1:1.

The commander of Seventh Air Force noted that the MiGs' aggressiveness, combined with their superb GCI and tactics, had brought the situation back to where it was at the end of *Rolling Thunder*.

But despite the talk of GCI, US pilots knew what the cause of most of their losses was – they had simply not trained against small aircraft that could turn well and were hard to see, and they were having a very difficult time simply seeing a MiG-21, much less successfully engaging it.

The Air Force began to look more carefully at the use of *Combat Tree*, a major part of MiGCAP operations. *Tree* was so good that often the F-4Ds could see the MiG's transponder at very long range – 50–60 miles – while a MiG-21 under normal circumstances could be seen only on radar inside of about 20 miles. From time to time *Tree* F-4 crews called out over the radio that they were locking on to MiGs at very long ranges and the feeling was the North Vietnamese monitored the MiGCAPs' radio calls and must have been able to tell that the Udorn F-4Ds had some way of detecting the MiGs at very long range. It seemed

The most famous *Red Crown* GCI controller was Chief Larry Nowell, who was credited with controlling US fighters – Air Force as well as Navy – to 13 MiG kills from March to May 1972 as well as saving four F-4s by getting them to a tanker when they were almost out of fuel. He was the first enlisted man in US Navy history to receive the Distinguished Service Medal for combat action. (US Navy)

the MiGs began to cut down on the use of their IFF equipment except at critical moments, thus limiting the usefulness of *Tree*.

Like the *Pave Knife* pods, the *Combat Tree* F-4Ds began to have a numbers problem. By July 1972 the eight *Tree*-equipped F-4Ds had been reduced to three because of combat attrition, and since they were in daily combat the possibility of more losses was always present. There was a push to get more *Tree*-equipped F-4s into the theater, and 20 more arrived during July, ending the crisis.

While the Air Force was suffering heavy losses at the hands of the MiGs the Navy had scored 20 kills for one loss, and these two kill:loss ratios reverberated at the Pentagon. The Air Force Chief of Staff, General John "Three-fingered Jack" Ryan, had regularly to hear at meetings of the Joint Chiefs of Staff how much better the Navy F-4s' kill ratios were than those of his Air Force crews, and he was furious. As a former "bomber general" he had no idea what to do about it, but some of his staff were former fighter pilots and explained how the problem was poor training. This set in motion a series of changes in Air Force air-to-air training that took place after the war, but Ryan had other issues as well. Not only air-to-air kill ratios were discussed at Pentagon meetings but also bombing missions, and while the Air Force had impressive results with the PGMs when the weather was good, the Navy was able to fly many more strikes and was much more flexible in its targeting, and thus was dropping many more bombs. This discrepancy was noted in the White House.

To stop the immediate bleeding Ryan went to Saigon in June to talk to the Commander of Seventh Air Force, General John Vogt, to discuss the issues. Ryan noted the discrepancy in bombing statistics and "suggested" that Vogt find a way to drop more bombs, recommending he consider bringing back all-weather F-111s to the area. He also suggested that it would be helpful if the wings cooperated more to solve problems on the bombing missions, an idea Vogt had already considered. To reinforce these points Ryan replaced Vogt's Director of Operations, General Alton Slay, with Ryan's own man, General Carlos Talbott.

Meanwhile, the North Vietnamese were no fools and adjusted how they engaged the Navy to improve their kill ratio. The most significant change was the virtual stand-down of the MiG-17 regiment, since the MiG-17s' performance was inadequate to deal with the *Top Gun*-trained Navy pilots. From then on, the North Vietnamese no longer engaged Navy F-4s unless they had an advantage. The result was that during June and July there was an increase in *Linebacker* Navy attack sorties but a decrease in the number of air-to-air combat incidents. From June 14 until the end of *Linebacker* the Navy shot down only two MiGs, while MiGs shot down two Navy F-4s and a third F-4 ran out of fuel after a dogfight.

In early July, under heavy pressure from Washington to keep the campaign going, the Air Force decided to try bringing its daily *Linebacker* strike in from the east, over the Gulf of Tonkin, hoping for better weather to complete each strike. The eastern Gulf of Tonkin or "feet wet" entry and exit were not popular with the crews. The Chinese buffer zone and the heavily defended Haiphong area forced the strikes to enter North Vietnam in a very narrow area where it was easy for the North Vietnamese to concentrate their defenses. Additionally, fuel was more of a problem (entering from the Gulf of Tonkin increased the number of tankers required by 30 percent), and there was less chance of a rescue for a crew on the flat areas of coastal North Vietnam than in the mountains of the west. Still, the eastern "feet wet" route had some initial success and appeared to offer the hope of ending some of the long weather delays that were handicapping the *Linebacker* strikes.

The Air Force had nothing to compare to *Red Crown*, but it did have an airborne control aircraft, a EC-121K called *Disco*, that occasionally provided useful information. (USAF)

The attacks continue

As the MiG successes mounted, the Air Force considered attacking the MiG bases but this was thought even less profitable during *Linebacker* than it was during *Rolling Thunder*. Now the North Vietnamese had a greater number of MiG-capable bases, most of them in the Hanoi area, where they were well defended, and for the United States to keep them closed would have required a major, continuing effort with possibly severe losses. The Air Force simply did not have the resources to do that and at the same time pursue the main aims of *Linebacker*.

Still, from time to time large strikes hit the airfields to force the North Vietnamese to keep their defenses up. These attacks occasionally destroyed MiGs on the ground and often cratered the runways, closing the fields for short periods. It was possible to attack the southern bases, which were less well defended, and for most of *Linebacker* the US air strikes kept these bases closed. Another possible target was the command and control network, but the dispersed, redundant system was a difficult target. When the Bac Mai Command and Control Center was wiped out by an LGB on July 4 it should have had an effect on the air defenses, but the next day MiGs were up and attacking Air Force strike packages, controlled by the two other centers at Phuc Yen and Kep.

By mid-July the MiGs introduced new tactics, not entirely successfully. They returned to high-altitude (30,000ft) attacks from orbit points while continuing to launch alert flights to quickly attack US flights that were having problems. On July 29 two MiG-21s took off from Gia Lam and less than four minutes later attacked a chaff-escort flight; the lead MiG shot down number 4 with an Atoll, but one of the escorts downed the second MiG with an AIM-7, and a MiGCAP F-4 shot down another MiG-21.

August: the monsoon arrives

Weather had a huge impact on *Linebacker* operations, since the LGBs and EOGBs required good weather to drop, and with the arrival of the monsoon season in August came a scarcity of days available for laser-guided bombing. Because of the small number of *Pave Knife* pods and the large support forces required, the Air Force could fly only one *Linebacker* mission a day, making Seventh Air Force very reluctant to cancel the mission for bad weather. To give the best chance of getting the missions off, the strikes were scheduled to hit the targets early in the morning; if the weather was bad, rather than cancel, the entire strike force would be put on "weather hold" for periods as long as eight hours. Despite the delays, weather caused about one-third of *Linebacker* missions to be canceled or recalled. The large number of aircraft involved in the daily *Linebacker* strike meant that during bad weather a high percentage of Air Force fighters in Thailand were sitting on the ground rather than striking

MiG-21s generally had a field day against poorly trained Air Force pilots flying in large, unwieldy formations. Here a MiG-21 pilot, Do Van Lanh, climbs down from his aircraft after shooting down an F-4 at the end of June 1972, a period when the Air Force had five F-4s shot down by MiGs without a single MiG kill in return. (István Toperczer)

targets in areas where the weather was good – a huge waste of resources. Some of the blame had to go to the mission planners, who for much of *Linebacker* paid little attention to the weather forecast – targets were selected based on priority, not the target weather.

Despite their losses and ARVN advances in August, North Vietnam showed no interest in peace talks, prompting the White House to pressure the Air Force and Navy to increase the bombing near Hanoi, Haiphong, and the Chinese border. The weather problems and the concomitant low number of sorties flown made the Joint Chiefs of Staff uncomfortable and led to proposals to try to expand the number of Air Force *Linebacker* missions from one a day to two a day by reconfiguring and streamlining the support packages. Scheduling two strikes a day would allow Seventh Air Force to put less of a premium on flying the first mission and it could be canceled sooner, allowing the forces to be used on other missions. There were several suggestions on how to reduce the size of the support force. One way was to allow area targets – ones that did not require PGMs – to be scheduled for strikes by aircraft carrying "dumb" bombs, thus having two types of strike force. Another proposal was to try to reduce the number of chaff aircraft by experimenting with differently sized corridors, aiming for the maximum result with the minimum of chaffers. However, because Seventh Air Force still believed that reducing the support force size would put the *Pave Knife* aircraft at excessive risk, throughout July just one *Linebacker* mission per day was scheduled.

The Joint Chiefs of Staff continued to press for more bombs on North Vietnamese targets and fewer support flights, and beginning in August 1972 Seventh Air Force changed the number of mass *Linebacker* missions from one to two a day and committed to having at least 48 bombers on these missions. Since the size of the LGB force could not be increased because of the shortage of *Pave Knife* pods, the second mission of the day would be a "dumb bomb" strike, with a much smaller support:strike ratio.

The commitment to two missions a day gave the Air Force planners much more flexibility to work around bad weather and increase pressure on the North Vietnamese defenses. Now missions could involve:

- guided or unguided bombs
- east or west entry
- chaff or no chaff, depending on the defenses
- target times very close or separated.

A MiG-21 in a F-4E gunsight at perfect firing range, 1,000ft. But this is a single frame, and the full gun camera film shows how bad USAF training was. The F-4 pilot never came anywhere close to being steady behind the MiG (which did not see him), did not lock on, which would have given him a full computing sight, and eventually emptied the gun at the unsuspecting MiG without scoring a hit. (Author's collection)

Despite Seventh Air Force's plans, in August dual missions were flown only twice because of bad weather and other factors. However, these were so successful that this became the Air Force norm for the rest of *Linebacker*. To add to the Air Force's flexibility, it began using a new, supposedly precision all-weather bombing system, LORAN (long range navigation), for bad-weather strikes. These missions involved flying in a tight formation in bad weather with an F-4 equipped with LORAN. This was a nerve-wracking mission over an area with SAMs and most Air Force pilots thought, probably correctly, that it was simply done to keep the Air Force's combat mission count as high as the Navy's. Postwar reports indicate that LORAN was ineffective, but it was widely used during *Linebacker* and allowed the Air Force to bomb North Vietnam almost every day no matter what the weather; furthermore, the system allowed LORAN Air Force F-4s to lead Navy aircraft on these all-weather missions.

Increase in the SAM threat

With the increase in the number of missions, many of which did not have chaff corridors, North Vietnamese SAMs were becoming more effective and the wing's pressed for destruction of certain specific SAM sites and this led the 366th TFW at Korat to develop SAM "hunter-

When the weather was bad – which was often – the Air Force had to turn to an all-weather bombing system, LORAN. As *Linebacker* continued, by the beginning of September the weather worsened, and LORAN bombing was the backup system, though it was considered more harassment than actually damaging. Here an F-4D with LORAN leads a flight, including a Navy A-6 and a Marine F-4, on a bad-weather bomb drop. The missions were not only nerve-wracking because they involved flying straight and level in tight formation over a cloud deck with SAM sites underneath, but also ineffective, since LORAN rarely worked properly deep in North Vietnam. (USAF)

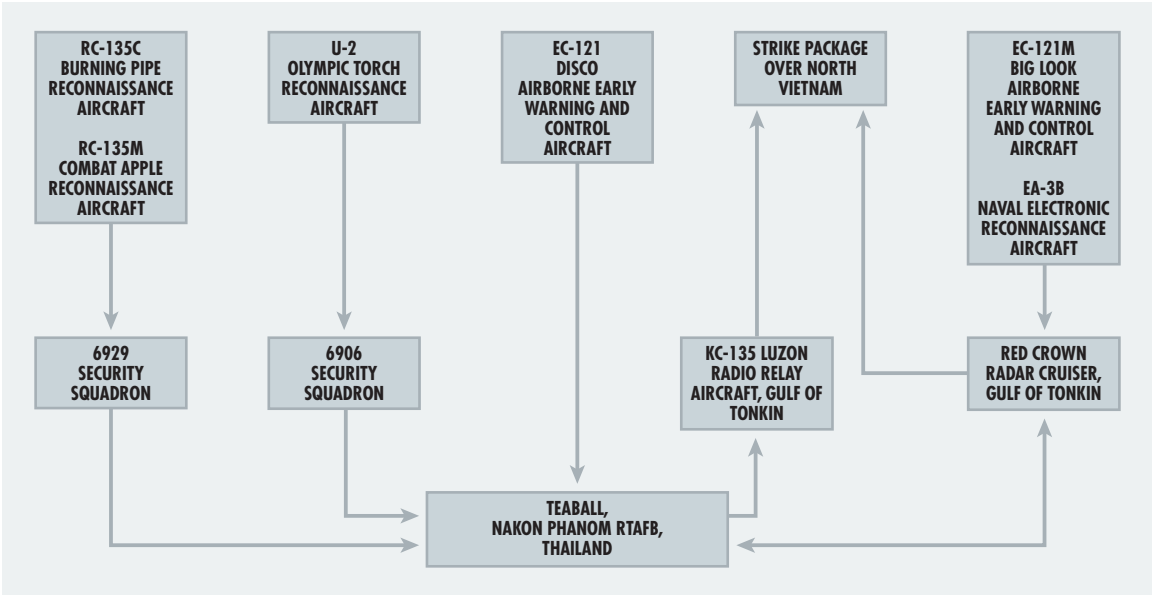
killer" teams of F-105Gs and F-4Es armed with cluster bombs. The hunter-killer idea had been under discussion for some time, and within a week the Iron Hand flights were flying these missions. In practice, a pair of F-105Gs flew ahead to locate the SAM sites with their sensors and then fired their anti-radiation missiles to take out the radar or force it to shut down, and the F-4Es followed up with CBU-52s, a new, very effective type of cluster bomb. CBUs made it possible for the hunter-killer teams to wipe out a site – the radar vans, missiles, and other equipment – whereas in the past all the ARMs could do was knock out the radar antenna. The F-4Es also played a useful role in protecting the F-105Gs from MiG attack.

The hunter-killer teams were usually directed to support the chaff or the strike forces, and the first part of the teams' mission focused on keeping the SAM radars off the air by firing ARMs. The Weasels aggressively orbited the SAM sites trying to draw the North Vietnamese into an attack; the North Vietnamese tried to avoid engaging the Weasels while waiting for the strike force. After the force left the area, if there had been no SAM activity the F-4Es accompanying the Weasels would attack known SA-2 sites or other targets – including airfields – with their CBUs. From the beginning, the hunter-killer missions worked well and proved extremely effective, forcing the North Vietnamese to move their missiles more often, pay more attention to camouflaging the SAM sites, and be very careful in turning on their radar.

Teaball

General Ryan had been dismayed at the Navy's kill:loss ratio, and General Vogt believed it was because the Air Force did not have a control system like the Navy's *Red Crown*. To that end, he pushed the development of *Teaball*, a highly classified system established to collate all signal intelligence on North Vietnamese air activity gathered by all sources, including *Disco* and non-military sources. *Teaball* was activated in August.

Despite General Vogt's push, *Teaball* was very cumbersome and slow. There were delays in *Teaball* receiving the information, and delays from the time *Teaball* acquired the information and relayed it through *Disco* (which often had to use an unreliable radio relay KC-135A Combat Lightning aircraft operating under the callsign *Luzon*), which canceled out its value for use in "real time." General Vogt was able to dictate by decree that *Teaball* was to be used as the primary control agency despite its unreliability, but this order was only honored in the breach. Flights that had a choice of controlling agencies, like the MiGCAP flights, still used



ABOVE: THE *TEABALL* SYSTEM

Linebacker was the first test of many Air Force high technology systems, not all of which were successful. Probably one of the least successful was an attempt to counter the Air Force's most pressing *Linebacker* problem – surprise attacks by MiG-21s – with a system called *Teaball*. Because of Air Force losses to MiGs, in June 1972 General John Vogt, the Seventh Air Force commander, put together a team with instructions to pull together all available intelligence information, collate it, and distribute it as rapidly as possible to the large USAF *Linebacker* PGM missions over North Vietnam. RC-135s over Laos and the Gulf of Tonkin collected North Vietnamese voice and electronic information, including real-time pictures of North Vietnamese radar screens, and there was also a direct link to the Navy's *Red Crown* GCI ship in the Gulf of Tonkin. The information was then passed to a Security Service squadron who in turn passed it to the *Teaball* operations center at Nakhon Phanom RTAFB on the Thailand–Laos border. The *Teaball* operations center analyzed the data with a highly classified system called *Iron Horse* and passed it to a radio-relay aircraft called *Luzon* to be distributed to the Air Force missions over North Vietnam. On July 26, 1972 *Teaball* began operations.

The Air Force crews were hesitant to use it at first, and General Vogt had to order them, especially the MiGCAP crews, to use *Teaball* as their primary source of information. But it soon became clear to the Air Force crews that *Teaball* was a failure. While the *Teaball* sources gathered the information in real time, it took several minutes to process the information and then pass it to the force, and even then it came in the form of general information – "MiGs behind you, attacking" – rather than much more useful specific information. Additionally, the *Luzon* radio-relay aircraft suffered frequent radio failures, which was not only costly but puzzling, since apparently Strategic Air Command (SAC) planned to use *Luzon*'s systems to pass information to its nuclear alert force.

By way of comparison, Navy (and Air Force) F-4 crews that used *Red Crown* not only had instant information provided without a radio relay, but also *Red Crown* could actively control their engagements.

Red Crown. *Disco* was the primary backup controller, but its usefulness remained limited because it could only control a few aircraft and had to provide warnings to strike, chaff, and escort forces via the "Guard" frequency, which all aircraft were supposed to monitor but most did not because it was overloaded.

Although the Air Force kill ratio improved to about 4:1 after *Teaball* was introduced and General Vogt gave his brainchild *Teaball* the credit, few agree with him, and after the war, in a formal review, *Teaball* was excoriated and considered of "limited usefulness." Most

To try to get an all-weather capability over North Vietnam, at the insistence of Air Force Chief of Staff Jack Ryan, the Air Force sent two squadrons of F-111s to Takhali RTAFB in early October 1972. The F-111 had a bad reputation early in the war for having aircraft simply disappear on a night mission, and it lived up to its reputation on this deployment. Two disappeared in a two-week period, and they flew only a few missions after that until the bombing stopped on October 23. (Author's collection)

losses to MiGs were from the escort flights and MiGCAPs, not the strikers, Wild Weasels, and chaffers, and the analysis noted that almost half of the losses of these important aircraft came in the short period after *Teaball* came into service, and several of these high value losses were blamed on loss of communication with *Teaball* as a MiG attacked. One Air Force MiG killer commented after the war: "*Red Crown* GCI was so far superior to our Rube Goldberg agencies that it is absolutely no contest. If we had two or three *Red Crown*s we would have doubled our MiG kills."

Linebacker Conferences

In mid-July a much more important part of cutting losses to MiGs began, the *Linebacker* Conferences. After the first few months of *Linebacker* it was clear that the problems of coordinating a single air strike involving aircraft from four (or more) bases was much more difficult than previously anticipated. During his visit to Saigon in June 1972 General Ryan expressed concern with problems of coordination of the *Linebacker* force and believed that the various wings were neither talking to one another nor expressing their problems to each other and trying to reach a mutual solution. At General Ryan's suggestion, on July 10–11 the Seventh Air Force held a conference in Saigon to try to solve some of the many problems with the *Linebacker* missions. The problems discussed ranged from the large ones – how all the MiG position information input could be combined into a single source that could give the *Linebacker* crews better MiG warning – to smaller ones, such as how to keep Air Force strike flights entering North Vietnam over the Gulf of Tonkin from mixing with Navy flights carrying out their missions in the same area. (It was agreed that the Air Force flights would stay at 16,000ft and above and the Navy flights at 14,000ft and below, and that the strikes would be separated by one hour.)

Even with its broad scope and limited immediate results, the July conference bore the seeds of major improvements in *Linebacker* operations. The response to the conference was so enthusiastic that the Air Force began to explore the possibility of more such conferences, including daily meetings to discuss the previous day's *Linebacker* missions.

Beginning in August Seventh Air Force decided to hold daily post-mission debriefings and critiques of the *Linebacker* missions at Udorn with all participants to try to quickly solve problems as soon as they arose. Udorn was chosen for the meetings because it was closest to Hanoi and therefore the first base the mission aircraft passed on their way back to their Thai bases. Element leaders and representative crews from each wing involved in the day's *Linebacker* missions were told to land at Udorn after the mission for the critiques, and at first the wings were very unhappy with the requirement because these crews, all of them flight

leaders, could not be used for the next day's missions.

In the beginning the conferences involved only the tactical wings, but they quickly expanded with representatives from the support agencies – GCI, planners, tankers – discussing what had gone wrong (and right) with the day's mission and looking at ways to solve the problems. The initial *Linebacker* Conferences were chaired by a general officer – the commander of Seventh/Thirteenth Air Force, a hybrid organization based at Udorn – and Seventh Air Force in Saigon also sent representatives.

At first, the idea of a mass debriefing in front of the Seventh Air Force staff and a general officer was not at all popular with the combat wings and the aircrews. The crews knew there were problems with the operation, but they also understood the "fog of war" and that mistakes were part of any combat operation. Based on bitter past experience, the crews were afraid that discussing mistakes made on missions in front of non-combat flying staff – who would report these mistakes to higher headquarters – would be another way for the leadership to put blame on the combat aircrews.

Fortunately, the crews' fears were unjustified. Any reluctance disappeared as the Seventh Air Force leadership was much more interested in "getting the job done" than in finding fault, and the critiques proved to be extremely beneficial to all parties concerned. Each mission was reviewed the day it was flown, with each critique involving some six hours of discussion. This was done daily until the end of *Linebacker* and was also used in December for *Linebacker II*.

It quickly became clear that, until the implementation of the *Linebacker* conferences, most crews had not known what the other flying and support organizations were really doing or what their problems were. The *Linebacker* conference mass debriefings were used as a tool for improving operations and passing on practical suggestions for improving tactics and procedures.

One example was that because of *Teaball* failures MiG-21s were regularly able to elude the MiGCAPs and get to the strike/chaff flights, and this put pressure on the close escort flight either to go after the MiGs as soon as they were warned of their presence – leaving the chaff/strike force unprotected – or to wait until the MiGs hit and try to counter the attack at close range.

To counter these MiG attacks, at the *Linebacker* conference on August 20 the wings agreed to change the MiGCAP and escort tactics. MiGCAP flights would fly immediately in front of the chaff and strike forces instead of patrolling near the MiG airfields, so they could be diverted

Nguyen Duc Soat's F-4 attack

At midday on October 12, two flights of F-4s were escorting two more flights of F-4s carrying LGBs that were scheduled to attack a bridge on the northwest railroad just north of Kep. The weather was not good, with broken clouds from the surface to 9,000ft, and an overcast from 16,000 to 18,000ft – and for this mission there was no chaff corridor.

As the force approached the target there were numerous electronic indications of SAM launches and the force was warned by a US control agency, *Teaball*, that there were three MiG-21s about 8 miles behind them preparing to attack.

One of the escort flights was Sparrow flight from the 35th TFS at Korat, and after the warning the flight leader saw two MiG-21s about 3 miles away off to the left. The flight turned left to engage the MiGs, but the formation was scattered, and Sparrow 03 fell behind trying to catch up after being distracted by the SAM and MiG warnings.

The MiG-21PFM flown by Nguyen Duc Soat of the 927th Fighter Regiment was several miles behind the MiGs that Sparrow flight was attacking, and Sparrow flight's left turn put them directly in front of Soat. He approached from below and fired a single Atoll at Sparrow 03, who was out of position on the far left of the formation. The missile hit, and Sparrow 03 felt a slight thump, then the F-4 violently pitched over and rolled to the right. The other members of Sparrow flight did not see the MiG but saw Sparrow 03 on fire and watched as the crew, Captain Myron A. "Joe" Brown and Lieutenant Cecil Brunson, ejected. They were captured by the North Vietnamese and were prisoners of war for six months.

Nguyen Duc Soat describes his kill of Sparrow 03 on October 12. (VPAF)

quickly to engage MiGs approaching the chaff/strike flights; this would allow the escort force to remain as a backup if the MiGCAP's engagement proved unsuccessful. The conference participants also agreed to allow some of the close escort flights to use some variations in tactics, even allowing them to operate as two-ship flights and vectoring one pair in a spoiling attack against MiGs when they were about 20 miles away, as long as they were under radar control by *Red Crown* or *Disco*.

Another early *Linebacker* conference noted that the MiGs had returned to orbiting at high altitude – about 30,000ft – before descending for their attacks, and this information quickly proved useful.

At the end of August, the *Linebacker* conferences and many of the changes the Air Force had made in July seemed to be working. The MiG kill ratio had improved significantly, and though only a few had been flown, the two daily strike missions had brought the support:strike ratio down from about 5:1 to 3.65 support aircraft for each strike aircraft.

In September the Air Force was regularly scheduling two strike sorties a day, one with LGBs and a heavy escort (about 3:1 support to strike ratio) and one "dumb bomb" strike with about a 1.5:1 support to strike ratio; overall the support:strike ratio was down to about 2.25 support aircraft for every striker, the best of the campaign. The strikes also added tactical flexibility – they could be executed sequentially or close to the same time and from different directions to put additional pressure on the North Vietnamese defenses.

Flying two daily missions had a side benefit that was somewhat unexpected – the percentage of missions attacked by MiGs dropped significantly. The North Vietnamese continued to fly the same number of MiG missions but appeared unable to increase them to keep pace with more US strikes; US intelligence speculated it was because of a limited number of pilots (possibly caused by attrition), interdiction of the airfields, damage to the GCI, or a combination of the three.

Return of the F-111

At the insistence of General Ryan, to give the Air Force an all-weather capability 12 429th TFS F-111As deployed from Nellis AFB and arrived at Takhali RTAFB, Thailand, on October 1, 1972, with an additional 12 429th aircraft arriving on October 3–4. A third group consisted of 24 430th TFS F-111As that flew directly to Takhali and prepared to fly the first combat missions.

The crews flew their first combat missions 33 hours after leaving Nellis. The strike was scheduled for six aircraft and assigned targets 55 miles northwest of Hanoi, but three of the F-111As ground-aborted with equipment failure, a fourth aircraft aborted in the air after its ECM equipment failed, and weather forced a fifth aircraft to bomb an alternate target. The last F-111A struck its target but never returned from the mission. On October 17 another F-111 disappeared, and the F-111As flew only a few more missions before the bombing was halted on October 23.

October 1972

To try to counter the MiG attacks, on October 1 the United States made some of its heaviest attacks on the North Vietnamese airfields during all of *Linebacker*, destroying five MiGs on the ground and damaging nine more. With the help of the *Linebacker* conferences, *Teaball*, and the airfield attacks, in September and October the Air Force claimed 12 MiGs shot down for the loss of five of its own. Unfortunately, intelligence reports were beginning to show that, despite the massive effort and the new guided bombs, the bombing campaign was not meeting its aims. An analysis of *Linebacker* strikes from August 22 to September 26 showed

that only 25 percent of North Vietnam's oil storage capacity had been destroyed, and electric power plant and transformer attacks had had few long-lasting results. The analysis also showed that the North Vietnamese were able to keep major highways open. Based on this, there was a shift in *Linebacker* emphasis, starting in late September and October to focus on targets in Route Packages V and VI that supported resupply from the Chinese border. Named Operation *Prime Choke*, it concentrated on fewer targets with greater force and consistent pressure. Then, on October 11, the commander of US forces in the Pacific announced the cessation of strikes in the Hanoi area, and there was a gradual reduction in sorties until October 23 when, at 7.00am Vietnam time, all air operations north of 20 degrees north ceased.

While the war was raging, Kissinger and the chief North Vietnamese negotiator, Le Duc Tho, were conducting secret talks in Paris, and Kissinger noted that the more the North Vietnamese lost on the battlefield the more willing they were to negotiate. Still, the talks moved slowly until October 8, when suddenly Tho announced the North Vietnamese acceptance of practically all the US proposals. It was a stunning development and as Kissinger wrote later: "Peace came in the guise of the droning voice of an elderly revolutionary … It was less dramatic than we ever imagined." On October 11 Kissinger and Le Duc Tho reached agreement on a peace settlement that was initialed on October 23.

Unfortunately, there was still one more act to play in December before America's war in Vietnam was over.

Results

At the beginning of June PACAF had been optimistic about the campaign and estimated that the supply lines had been interdicted so much that the PAVN would not be able to sustain full combat operations; however, in early August an assessment by the Joint Chiefs of Staff concurred that *Linebacker* had substantially disrupted the enemy's transportation and distribution system but that the PAVN was still a powerful force. In October an even more pessimistic report came from PACAF, estimating that the North Vietnamese had the capacity to import by truck 10,000 tons of cargo daily from China, twice the volume they had been able to muster by ship and rail prior to *Linebacker*. An internal Air Force evaluation of the Easter Offensive conducted in the fall concluded that:

> "[I]n spite of the substantial US air effort devoted to the Linebacker operation, we were unsuccessful in our objective of isolating [the PAVN] from its outside sources of supply. We should have recognized that this objective was unattainable, without politically unacceptable changes in the rules of engagement."

A MACV (Military Command, Vietnam) study of the Easter Offensive concurred with the Air Force findings and analyzed why *Linebacker I* did not have more impact on PAVN operations. It found that the PAVN logistic reserves stockpiled in South Vietnam prior to the invasion were so large that they allowed the PAVN to accept the shortfalls in resupply during the four to six weeks it took for Hanoi to adapt its supply routes from railways to roadways after *Linebacker* knocked out the bridges. The PAVN preparations were such that it was never forced to cancel or alter any of its major operations for lack of supplies.

While *Linebacker* increased the costs and time for the North Vietnamese to send supplies to the South, nevertheless with the men and weapons already deployed to South Vietnam and its stockpiles in place prior to the invasion the PAVN was able to transition from railway to dispersed road transport and negate the effects of the air interdiction campaign.

Such preparations neutralized the initial impact of *Linebacker*, leaving it to air strikes in South Vietnam to block the resupply of PAVN front-line troops, and this is where the air campaign was decisive.

ANALYSIS AND CONCLUSIONS

The famous Thanh Hoa bridge, known to the Vietnamese as Ham Rong, the "Dragon's Jaw," and one of the key supply route choke points, was dropped on May 13. (AFHRA)

Air power played a decisive role in the defeat of the PAVN in the Easter Offensive. Without US air support, it is hard to imagine a successful ARVN defense in MR I, II, or III. With it, the defeat of the Easter Offensive was possible and this, in turn, brought the North Vietnamese back to the Paris Peace Talks. However, the *Linebacker I* air interdiction campaign in North Vietnam was not decisive because it took too long to take effect. Instead, it was direct attacks by US air power on the PAVN forces and in the South that allowed the ARVN to hold at An Loc and Kontum and that turned the tide at Quang Tri. But the use of this air power depended on control and coordination, and the air strikes would not have been possible without the combination of US ground advisors, US FACs, and the US-administered TACS. Indeed, the absence of a functioning US TACS in MR I, combined with the bad weather at the beginning of the offensive, played a large role in the ARVN collapse in the North in the opening month of the offensive.

Postwar North Vietnamese accounts are most useful and they underscore the impact of their own overextension and the massive amounts of US firepower applied in MR I. In its conclusions on the Quang Tri offensive and ARVN counterattack, a 1987 Vietnamese report stated:

> A point that requires special note and a full and adequate assessment is the direct participation of US Air Force and the US Navy fire support forces in large numbers to provide very intense and massive fire support. This was the heaviest amount of American firepower provided to support a single campaign in the entire history of the American aggression against South Vietnam, including even campaigns fought primarily by American ground forces; in terms of B-52s alone, during June 1972 the enemy flew an average of 135 B-52 bombing sorties per day, and more than 200 sorties on one day when the sortie level was the highest.

A 1976 internal, classified North Vietnamese history of the Quang Tri offensive acknowledged the singular role of air power in upsetting the communist advance:

> During combat, with the increased American fire support, the puppet [South Vietnam] was able to erode our troop strength and equipment levels, increasing the ferocity and complexity of the battle and having an enormous impact on the combat strength of our troops. In practical terms, the intensity of US firepower, which had been reinforced to the highest level possible, had a decisive impact and rescued the puppet army from complete collapse. Although we anticipated that the United States might resume bombing, we did not fully anticipate the capabilities and the full impact US air and naval firepower would have on the progress of the campaign. For that reason, our assessments of the puppet army were sometimes subjective, simplistic, one-sided, and not in tune with the developing situation, and sometimes our battle plans were not sufficiently based on reality.

More evidence of the impact of CAS and BAI comes from the US advisors and North and South Vietnamese accounts. All of them emphasized the role that tactical air and particularly B-52s played in the defeat of the PAVN in all three regions. Also of critical importance was the C-130 air supply, without which An Loc and Kontum might have fallen no matter how many bombs were dropped. On May 5 General Abrams captured this sentiment in his remarks to the MACV staff:

> On this question of the B-52s and tactical air, it's very clear to me that – as far as my view on this is concerned – that this government would now have fallen, and this country would now be gone, and we wouldn't be meeting here today, if it hadn't been for the B-52s and the tactical air. There's absolutely no question about it.

Other officers felt that the support provided by US tactical air and the B-52s on all major fronts was timely and most effective; it not only destroyed many enemy formations but also sustained the morale of the ARVN soldiers. One described the US Air Force's contributions to the ARVN success in repelling the invasion: "Quang Tri certainly could not have been retaken, nor could ARVN forces have held at Kontum and An Loc, had it not been for the support provided by the US Air Force … The only adverse effect that can be attributed to the use of B-52s was that in time, ARVN forces became too dependent on them."

Unfortunately, this last line proved prophetic. In 1975, when North Vietnam invaded South Vietnam again, the ARVN did not have massive air support from the US and quickly collapsed, ending the conflict once and for all.

A lesson learned

While the air strikes and resupply were critical in the South, the results of the interdiction campaign are not clear. Although there is no question that dropping the bridges and mining the harbors made the transportation of supplies more difficult, there is no real indication that it seriously slowed the PAVN operations. On the other hand, the successful use of PGMs had a long-term effect on the US military. The pictures of downed bridges and other small targets was a propaganda coup for the Air Force and offset the bad news about its poor performance in other areas, especially air-to-air combat. The ability to strike small point targets in populated areas generated, to use an overworked term, "a revolution in military affairs," and very precise bombing is accepted – indeed expected – today.

The poor performance of the Air Force in air-to-air combat was already reverberating before *Linebacker* was over. General Ryan, who, as mentioned earlier, had been embarrassed by the Navy's air-to-air success, had already directed changes in the Air Force air-to-air training program and in Air Force combat flying training in general, with an emphasis on realism. Within a few years the Air Force had developed a combat training program second to none, and its *Red Flag* exercises were setting the standard for such training.

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